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THE BUILDING NEWS

AND ENGINEERING JOURNAL.

ARCHITECTURE AND ENGINEERING DURING 1869.

ARCHITECTURE.

ONLY a few important works were inaugurated during the year just past, but many which date their origin from a period of greater enterprise have either been brought to a successful completion or else been considerably forwarded towards that issue during the course of the last twelve months. Neither architects nor engineers can fairly complain of a lack of opportunities fitted to test the skill and talent now possessed by either profession. Although England has not witnessed in its metropolis or in its provinces such gigantic strides in the direction of progress or change as have been fostered under the Imperial hot-bed system in Paris, or even in the subordinate towns, as Marseilles, we are not sure that with less haste there has not been almost equal speed attained, and, though somewhat silently, yet very surely, London is becoming quite as thoroughly transformed under our eyes, as Paris is under those of our neighbours. Even now, to a spectator standing upon either of the West End bridges, nearly all the more prominent structures which meet his view are such as he may have seen in course of erection; and though, if he have any architectural feeling or knowledge, he must find much therein to wound his sensibilities, yet he cannot but acknowledge that upon many of them individually, and certainly upon them collectively, is impressed a character of boldness not altogether unworthy of the age. If he seek for unity of style, he will indeed be woefully disappointed. At the same time there is an entire absence of that monotony which so painfully characterises the cotemporary French works, which are perhaps more equally and academically correct.

In Ecclesiastical architecture—which we name first, as in it alone at the present day the display of some sort of artistic character is considered essential, and therefore it is the best fitted to afford a gauge of our architectural capabilities—London has not received many very recent additions of note. Mr. Scott, whose works are still far in advance of those of any of his compeers in quantity, if not in quality, but whose restorations at least are a favourable feature of the age, is bringing to a close that most interesting one of the Chapter House at Westminster, and in the provinces is proceeding with those of the Cathedrals of Salisbury, Gloucester, Worcester, Lichfield, Chester, S. Asaph, and S. David, and the Abbey at Bath. Works of still higher importance, as involving large additions to the Cathedrals of Bristol and Llandaff, have been conducted by Mr. Street and Mr. Prichard, and in Ireland, Mr. Burges is still proceeding with his new cathedral at Cork, while in Scotland that of Inverness, by Mr. Ross, has been finished, and opened.

S. Barnabas Church has been completed at Oxford by Mr. Blomfield, and a short time since we favourably reviewed it as a novel experiment. The restoration of the noble church of S. Nicholas, Great Yarmouth, is in progress, a large portion now being rebuilt by Mr. Seddon; and the chancel of a new church dedicated to S. James, almost upon the same colossal scale, has just been erected in the same town by the same architect, who has also in hand the rebuilding of the east end of S. Nicholas, Grosmont, one of the finest churches in Monmouthshire, and the restoration of the quondam Cathedral Church at Llanbadern, near Aberystwith. Croydon Church and S. John's College Chapel at Cambridge are other of Mr. Scott's important works, as S. Margaret's at Liverpool is of Mr. Street's. Bolton Church, by Mr. Paley, the Roman Catholic Pro-Cathedral at Kensington, by Mr. Goldie, and S. Luke's, New Kentish Town, by Mr. Champneys, are all worthy of notice.

Of educational buildings, perhaps the most important are the Keble College at Oxford, in a somewhat startlingly-polychromatic style, by Mr. Butterfield, and the Glasgow University, by Mr. Scott, the additions to Balliol College, Oxford, and to Gonville and Caius College, Cambridge, by Mr. Waterhouse, the Clarendon Library, by Mr. Deane, and the New Dulwich College, by Mr. Charles Barry. Most of these are vast and costly buildings of unquestionable merit, though various in degree; we fear, however, they will fall sadly short of the quiet and satisfactory character of their less pretentious mediæval prototypes. The University of London, by Mr. Pennethorne, is an ambitious and praiseworthy work, of considerable originality, in the Italian style, in which sculpture forms a large element, possibly somewhat in excess of what is prudent, since its seated figures in armchairs and bare-headed statues would seem better suited to the interior than the exterior, in our climate and atmosphere. The middle-class schools at Bedford, by Mr. Peek, the Wesleyan College at Headingley, near Leeds, and the new Charterhouse Schools, by Mr. Hardwick, may also be named as other important educational establishments of recent erection.

Of charitable institutions, perhaps the most useful are those which provide the much-needed dwellings for the artisan and poorer classes, such as those to which the late Mr. Peabody devoted so large a portion of his wealth. A block of buildings, erected from the designs of Mr. Darbishire for the trustees of that fund in Westminster, has recently been opened, and Mr. Seddon has built another on the estate of the Bishopric of London at Fulham, and also has commenced an orphanage for sixty children for Mrs. Tait, upon the private estate of the Archbishop of Canterbury at Broadstairs. Again, S. Thomas' Hospital, of which Mr. Currey is architect, forms a stately range of buildings, extending from Westminster Bridge to Lambeth Palace, immediately opposite the Houses of Parliament.

Although the rage for building speculative hotels has received a check not otherwise than salutary, yet the great Gothic hotel and terminus of the Midland Railway near King's Cross, by Mr. Scott, and that by Mr. Waterhouse at Liverpool, if the last, are certainly not the least among their gigantic compeers; to the completion of the former we look with interest, as an experiment in the application of the Mediæval style to the most practical requirements; the latter, we regret to say, is of too nondescript a character to excite the same feeling. Far better than either is the massive pile constructed as the Great Northern Hotel, at Leeds, by the Messrs. Hadfield and Son, of Sheffield.

Manchester has its Town Hall in progress, and we hope it will prove the *chef d'œuvre* of Mr. Waterhouse; while Liverpool has its municipal buildings just finished, a stately structure by Mr. Robson, and its Exchange is approaching completion, from the designs of Mr. Thomas H. Wyatt. Sir M. D. Wyatt also has exhibited lately several works that he has in hand, most notable among which, but very open to criticism, is the interior of the India House.

Messrs. Banks and Barry are engaged upon their home for the several learned societies, which is intended to form the façade towards Piccadilly of the triple group occupying the site of Burlington House and grounds, of which the goodly range of new galleries of the Royal Academy form the central portion.

Steadily also are being carried on the several structures which are to embellish South Kensington, but their extent is so large that their progress is necessarily slow; but ere long we shall have in the Albert Hall, the Albert Memorial, and South Kensington Museums, a group of buildings of which any capital might be proud, and they are now rendered accessible from all parts by the girdle with which the Metropolitan Railway is connecting the City with its suburbs.

The limits of our space warn us that it must suffice but to name the street leading to the Mansion-house, already dignified by Mr. I'Anson's Bible Society's establishment, and the Metropolitan Meat Market, in Smithfield, by Mr. Horace Jones, to show that neither architects nor engineers have been idle during the year 1869 just closed, and are not very likely to remain so during the new decade to which 1870 A.D. has introduced us. We look forward with hope that it may be not less distinguished by the erection of the proposed New Law Courts by Mr. Street, as well as by many other works in which art may be an equally prominent feature, and though many circumstances doubtless press upon the nation the necessity for caution in expenditure, we trust that such may not be unduly exercised in matters in which the civilisation and the welfare of the people are more concerned than politicians are often wont to allow.

ENGINEERING.

HAD the year 1869 nothing else to boast of but the opening of the Suez Canal to the traffic of the world, it would be more than sufficient to gild with glory its declining days, and render it memorable in history. The enterprise may be justly regarded as the *chef d'œuvre* of the bygone year. There are, however, some others that are not without importance and value, that cannot be passed over in silence. A glance may be directed towards the undertakings partly in prospective, and partly in operation on the coast of Holland. The Dutch have always been considered as excellent hydraulic engineers in their own particular line, which consists mainly in counteracting the perpetual endeavours of the sea to recover its ancient territory. Not content with main-

taining their supremacy over the billows, they contemplate works on a bolder scale, and have called in the assistance of Mr. Hawkshaw to enable them to put their projects into execution. In the matter of docks, some little amount of work has been done at home; some of the London companies having found it imperative upon them to increase their accommodation for storage, and the berthing of sea-going vessels. Among the principal extensions of this description is the addition made to the West India Docks.

It cannot be said that the railway system has received, in the Old World, at least, any considerable development within the last twelve months. So far as any extension of the European *réseau* towards the frontiers of Asia is concerned, nothing has been accomplished, and the more remote Oriental regions are still in ignorance of steam locomotion. Certainly short lines have been constructed in various parts of the Continent, but these are principally similar to the few opened at home, loop or tie lines, and would never have come into existence but for the previous construction of other routes. Passing into the New World, there is undoubtedly a line that merits recognition and approval. The Central Pacific traverses for upwards of 3,000 miles the chequered landscape lying between New York and San Francisco. The journey is one incessant repetition of succeeding civilisation and barbarism. From the houses of the settlers to the hunting ground of the Indians is but a step for the locomotive, and one has barely time to realise the romance that is attached to the prairie and the forest, before the country assumes another phase less savage and rude. As a great national artery of intercommunication, the Pacific line is unrivalled, not only in its extent, but in the almost incredibly short period of time in which it was constructed. Perhaps the less that is said about its actual construction the better. American ideas on these matters are not ours, not to mention that a system of construction may answer admirably in a new, undeveloped country, which would be perfectly intolerable in one like our own, where the comfort of the subject is so carefully attended to. The large use made of timber, the immense quantity that exists in America, and the facility with which it can be rendered available for the purpose, are substantial reasons for the railways of the New World not possessing those elements of durability and solidity which are to be found in those designed on a totally different principle.

Unfortunately for one of the most prominent works which the past year gave to the public as completed, some mismanagement or incompetency on somebody's part prevented 1869 from witnessing the Holborn Viaduct a finished structure. A bridge in which the pedestals of its supporting columns evince outward visible signs of deterioration and disintegration cannot be classed among the completed works of the year. It ought to be, but it is not. From the street to the river is but a short leap, and certainly the former, so far as obstructions are concerned, has not much the advantage of the latter. For five long years have piles, scaffolding, timbers, fenders, and other obstacles impeded the waterway in the vicinity of Blackfriars, not to allude to those hideous wooden erections on the up stream side of Charing-cross bridge, which belongs to the defunct Waterloo and Whitehall subfluvial tramway. If nothing is done by this company towards the resuscitation of its affairs, and the progress of the works before next June, the river must be cleared of the impediments referred to. Now that New Blackfriars-bridge is opened to the public, a very short time will suffice to clear away the temporary accessories that contributed to its erection. The wooden structure between the new bridge and that of the London Chatham and Dover Railway, is fast disappearing under the united efforts of hammers, bars, wrenches, shear-legs, and levers of all descriptions, and soon not a vestige of it will remain. Cotemporaneously with the improvements in our thoroughfares, streets, and buildings, considerable exertions have been made to render the banks of the Thames along its metropolitan course worthy of the fine river that flows between them. The completion of the Southern Embankment, and the new road running from Westminster to Vauxhall-bridge, will vastly improve the value of property on the Surrey side of the Thames. This desirable event will be accomplished not only by the broad avenue opened up into South Lambeth, but also by the demolition of a whole nest of frightful slums which extended along the bank up the stream from Lambeth Suspension Bridge. With three works so nationally important as the Viaduct, Embankment, and Bridge, opened for the public use, and serving as ornaments to the metropolis, the year 1869 has done more for the utility and beauty of London than many of its predecessors. It is true that it has not been possible within its limited period, to re-establish professional and business transactions on the same scale upon which they existed before the year 1866, but this is not to be wondered at. An evil that has been accumulating slowly aud imperceptibly, but no the less surely for years upon years, is not to be removed in a twelvemonth. But although it is not altogether removed, it is ameliorated, and it is not a mere surmise, but a valid and well-founded expectation that confidence will be speedily restored, and that with the past year will be buried all those fraudulent schemes and insolvent speculations, which are dangerous to the wise, and snares to the foolish.

WESTMINSTER ABBEY.*

THE Dean, in his preface to this supplement to his former work, explains its purpose to be the correction and addition of matter pointed out to him by critics and others, and justly states that, "It is only by such information that a work touching on so many points of English history and art can be brought to anything like the correctness which the subject requires." He also adds that "other additions have been made from the constant appearance of fresh objects of interest in the Abbey." A great many new and interesting illustrations have also been added, and the 178 pages thus compiled, form no mean volume in themselves, and one which certainly no possessor of the work to which it is an addendum should be without.

From its necessarily miscellaneous contents, many gleanings of value to the architectural student may be extracted. In plate 1 we have representations of five of the bas-reliefs from the frieze of the Shrine of Edward the Confessor, which have an intense though rude dramatic character. "The Remission of the Danegelt," stored in very ordinary casks; "The Pardon of the Thief," who is engaged in rifling the iron-bound treasure chest, while the king is quietly watching his nefarious proceeding from his bedstead in the background; "The Shipwreck of the King of Denmark;" "The Visit to the Seven Sleepers"; and "S. John and the Pilgrims," are all quaint, if commonplace delineations of facts, or what the simple faith of those times deemed to be such, in a style which we could wish was used in our day to chronicle passing events worth chronicling, of which we have no lack.

At page 7 we are told to read, "The Coronation Chair, doubtless standing where it now does, but facing, as it naturally would, westward, was then visible down the whole church, like the marble chair of the Metropolitical See at Canterbury, as when it stood in its original position at the east end of the cathedral. When the Abbot sat on this royal chair on high festivals, it was for him a seat grander than any episcopal throne. The Abbey thus acquired the one feature needed to make it equal to a cathedral—a sacred chair, or Cathedra." In Plate 3 we have a view of this ancient relic, and also of the Shrine of Edward the Confessor in its present sadly despoiled and mutilated condition. It would be well if in a future edition could be added, by way of contrast, a representation of it restored to its pristine splendour, such as Mr. Burges has, by his research and imagination, already portrayed it.

In the 5th and 6th plates are given, to a scale sufficient fairly to represent them, a portion of the Chantry of Henry V., and the helmet, shield, and saddle of that monarch, which still remain suspended over his tomb. Merely as picturesque vignettes, follow sketches of the monuments of Sir Francis Vere and of Chaucer, and then a plate showing that to Mrs. Nightingale. With regard to the latter, the Dean quotes the following absurdly laudatory passage from "Wesley's Journal": "Mrs. Nightingale's monument has not been praised beyond its merit. I once more took a serious walk through the tombs of Westminster Abbey. What heaps of unceasing stone and marble! But there was one tomb which showed common-sense: that beautiful figure of Mr. Nightingale endeavouring to shield his lovely wife from Death. Here, indeed, the marble seems to speak, and the statues appear only not alive." Now that the proprieties of monumental sculpture are better understood than when that passage was written, and such vapid sentimentality is out of favour, we should have liked to have seen this extract accompanied by some judicious and qualifying remark of the Dean to direct public taste to take a more reasonable view of the monument in question.

In plates 10 and 11 we have picturesque views of the Cloisters, showing the entrance to the Chapter House, and the interior of the restored Chapter House itself, and in page 59 we are told "That over the entrance to the Chapter House, significant of the purpose of the edifice, was a picture of the Last Judgment. The vast windows, doubtless, were filled with stained glass. Its walls were painted in the reign of Edward IV., by a conventual artist, Brother John, of Northampton, with a series of rude frescoes from the Apocalypse."

As regards this alleged rudeness of the paintings, we set such a value upon their faded fragments, and consider them as possessing so high an intrinsic merit, independently of their antiquarian interest, that we trust no attempt will be made to supersede them by any less rude modern work, and glad indeed shall we be if the painted glass which is about to fill the glorious old framework of the windows be in any degree consistent and harmonious with these ancient decorations on the walls.

At page 61 we read that "A few arcades and pillars mark the position of the ancient hall and chapel of the Infirmary, which here as elsewhere, has been absorbed into the modern capitular buildings. The chapel, of which the proportions can be imagined from the vast remains of the corresponding edifice at Canterbury, was dedicated to S. Catherine. This, rather than the Abbey Church itself, was used for such general ecclesiastical solemnities as took place in the precincts."

At page 66 we have the following interesting information about the work of decorations of the interior:—"In the close of the fifteenth century we can see the conventual artist hard at work in beautifying the various chapels. Their ceilings, their images were all newly painted. An alabaster image of the Virgin was placed in the Chapel of S. Paul, and a picture of the dedication of the Abbey. Over the tomb of Sebert were placed pictures, probably those which still exist. Then was added

* "Supplement to the First and Second Editions of 'Historical Memorials of Westminster Abbey.'" By ARTHUR PENRHYN STANLEY, D.D., Dean of Westminster.

the Apocalyptic scene, round the walls of the Chapter House. Then we read of a new service book, highly decorated and illuminated, and presented by subscription from the Abbot and eight monks. As the end draws near, there is no slackening of artistic zeal. The Abbot was more devoted to the work of decoration and repair than Islip, and of all the grand ceremonials of the Middle Ages in the Abbey, there is none of which we have a fuller description than that one which contains within itself all the preludes of the end."

A communication, by Mr. Poole, in pages 117 and 118, relative to what is called "The Middle Tread," will be of interest to our readers. This was a central course of stone running along each walk of the Cloisters, having squares placed diamond-wise on either side of it, and a course of square stones against each wall.

Mr. Poole says:—"The same arrangement of diamonds and squares is yet distinctly traceable in the two ambulatories, and in the two aisles of Henry's VII.'s Chapel. . . . These middle treads may have been serviceable in guiding the processions of the clergy. In the nave and its aisles there must have been similar patterns. . . . In the recent restoration of the pavement of the north aisle of the choir, and in the adjacent western aisle of the transept, the feature of the 'Middle Tread' was just distinguishable; and under the direction of Mr. G. G. Scott, the architect, it was carried out in the new floor."

The 16th plate, representing the Monument of Henry VII., with the entrance to the tomb below, as seen on opening the vault in 1869, from a drawing by George Scharf, Esq., is clearly and well given, and is interesting; as also are the woodcuts in page 142, of some marble fragments of a frieze of Torregiano's "Matchless Altar," that were discovered during the same exploring operations carried on in the royal vaults, the stone coffins and contents of which, now that modern curiosity is satisfied, will, we presume, ever more rest in peace.

Even this careful supplement, we believe, does not exhaust the list of discoveries made in the precincts of the Abbey down to the present time, and will need to be again supplemented in its turn, but we feel sure that the interesting labour thus entailed upon the Dean will not exhaust his praiseworthy enthusiasm, and we look forward with confidence to his being enabled, with the assistance of the same coadjutors to whom he repeatedly refers, to render his valuable work as complete and reliable an account of all the "Historical Memorials of Westminster Abbey," which it is in the power of the present age to collect. JOHN P. SEDDON.

ILLUSTRATIONS OF WINDOW TRACERY.

(*Continued from page* 417.)

FLAMBOYANT TRACERY.

FLAMBOYANT tracery is much more common on the Continent than in this country. In fact, it might be said, if we were to speak very strictly, that there is no purely Flamboyant window in all England, although the principle is very often seen to affect a composition, and to mingle very freely, even to a predominating extent, both with flowing and geometrical patterns. The true idea of Flamboyant tracery is the prolongation of the mullions in waved lines. It may be distinguished from flowing tracery by observing that while both of them are continuations of the mullions, the flowing produces figures which give us some idea of independence of the mullions. In the true Flamboyant style this notion is lost, and in following the lines of the tracery the eye perceives simply and solely a prolongation of the mullions with foliated spaces between. This gives a very strict and intense unity to the composition. There are no void spaces, no sub-arcuation, no centre-piece, no subordination or predominance of any particular figure or figures; all is equal, all well balanced, and, as Mr. Freeman, indulging in a bit of Ruskinism, observes, it "might almost suggest the late watchwords of the nation among whom it attained the greatest prevalence, and a Flamboyant window be deemed an architectural exposition of Liberty, Equality, and Fraternity." To this he will perhaps allow us to add that the general flame-like effect of the whole composition forms a lively image of what resulted from that nation's premature attempt to enforce the said doctrines. We must refer our readers for illustrations of the typical French Flamboyant windows to those at Harfleur and S. Germain Pont Audemar, represented in Rickman's "Gothic Architecture," pp. 424, 425. We give, as an English example, the window at Bolton Abbey (see fig. 54). In this the principal lines of the tracery follow curves, of which it is hard to say whether they belong to the flowing or Flamboyant style, and form three Flamboyant figures, each of which is filled with four others. Some of these subordinate forms, however, approach nearer to the reticulated type, and forbid the classification of the window as pure Flamboyant. A mixture of the same kind is to be found in every English Flamboyant window that we have observed. In fact, Flamboyancy, which on the Continent at once assumed a distinct and decided form, was here scarcely more than a modification of the reticulated, influenced to a greater or less extent by the prevailing continental fashion. Thus the very fine five-light window at Sleaford Church, shown in fig. 55, exhibits several figures of a purely reticulated pattern, others being so elongated as to assume a Flamboyant form. There is also in this window an evident tendency to mark the arcuation of the lights, in the much less distinctive manner peculiar to the Flamboyant style. The fusion of the reticulated and Flamboyant ideas is also very strikingly marked in the large four-light window at S. John's, Jersey, shown in fig. 56. Here a quasi-reticulated pattern is filled up with a Flamboyant version of divergent tracery, the foliation, however, being at the lower end. The vertical lines in this window show a tendency to the Perpendicular, which finally became the prevalent style in this country, and held its ground until the period when pure Gothic architecture fell into the long slumber from which it has awakened only during the present half-century.

PERPENDICULAR TRACERY.

We have before noticed that the Flamboyant and Perpendicular styles have a common characteristic of the tracery being merely a prolongation of the mullion. In the former the lines are wavy, in the latter they are straight. This leads to a further common characteristic, namely, that the only possible tracery in both styles, when in a pure state, is the foliation of the intermediate spaces. A pure Perpendicular window is not therefore capable, like those in the Geometrical and flowing styles, of challenging attention, as the chief feature of a building, by the variety and magnificence of its details, but on the other hand its forms are so simple and so easily treated, that the designer, if he is content to confine himself to the style in its uncombined purity, can hardly fail to attain a very respectable mediocrity, because it opens no door for the indulgence of tasteless and incongruous vagaries and combinations. Regarded from this point of view it bears some analogy to the Early English, which also consists of very easy repetitions and combinations of very simple forms. The flowing style, except the reticulated variety, should not be attempted by any but a designer who has thoroughly mastered all its peculiarities. Mr. Petit (as quoted by Mr. Freeman) believes that it was the introduction of the Perpendicular style, and the simple and easy way in which its ornaments, in perfect consistency with the peculiarities of Gothic, might be multiplied to an almost indefinite extent, which saved Gothic architecture in its decadence from utter debasement. Another peculiarity of the Perpendicular is that it permits of the erection, so to speak, of ranges or stages of tracery. We are no longer confined to the mere pyramidal figure which must influence the other styles to a very great extent. The peculiar simplicity and beauty of the style is seen in the fine five-light window from Swinbrook, Oxon, shown in our illustration (fig. 57). Here the foliation of the figures across the centre of the arch gives the idea of a foliated transom. In other cases a plain transom is introduced, and supermullions rise above it, originating a new stage of the tracery, when the window is said to be supermullioned. The tracery is also sometimes commenced below the spring of the arch. In this case and several others it is very common to group several of the lights together by the lines in the tracery forming another arch in the head. This produces a very pleasing variety, and creates spaces which are often filled with quatrefoils of reticulated figures. In the east window of Rushden Church, Northants, there are three foliated lights in the lower part of the window, but at a considerable distance below the head these are each subdivided into two stages of two foliated lights, each giving, two stages of six lights, while in the head the tracery again forms the three lights of the lower part, the apex of the arch being occupied by two smaller foliated perpendicular figures surmounted by a quatrefoil. Subarcuation is used as a means of introducing a very great variety in Perpendicular windows. In some cases the sub-arches will spring from the centre mullion without any complementary lights, in which case it is evident that the number of lights must be even. In others they spring from the mullions on each side of the centre, leaving a complementary light. These arrangements bear a very close analogy to the arch tracery of the previous styles, and they afford the opportunity for the introduction of many figures of the Geometrical, reticulated, or other patterns. Another variety of Perpendicular has received the name of alternate tracery, which is, where a tracery bar rises from the crown of the separate lights, but none from the mullions. It may be considered, on the whole, the most graceful of the varieties of the Perpendicular. It has less opportunity for richness and variety in the lines than the supermullioned, but has far less stiffness and monotony. It has the same general effect as the reticulated, the same uniform expansion over the whole design, and the same difficulty with regard to the imperfect piercings or spandrels. Fine examples of this style are to be seen at Rochester Cathedral and at Towcester. Windows in this style are occasionally subarcuated, and it is also used in combination with supermullioned tracery. Another variety of Perpendicular has received the name of panelled tracery. Its title to the name of tracery is, however, somewhat doubtful. It is formed by a simple continuation of the mullions alone, without any bars springing from the head of the lights, and as nothing springs from the apices of the lights, it almost necessarily follows that a transom should be thrown across at that point, otherwise the unfinished appearance of the arches unconnected with anything would be intolerable. This renders it impossible to draw any distinction between a transom across the tracery and a transom across the lights, and more especially where the tracery commences below the spring of the arch—the general effect is to lead us to practically estimate the number of lights at double its real amount. The style is, however, so unsightly that examples of it in a pure state are extremely rare. The only one cited by Mr. Freeman is at Clent, in Staffordshire, and of this he is somewhat doubtful.

A more interesting variety of Perpendicular windows are those which were formed during the transition from the flowing style. The principle of the Perpendicular, existing also in the flowing, the two styles melted and commingled in the most harmonious and natural manner. The different varieties of the flowing tracery suggest Perpendicular ideas so naturally, that in proportion as they more completely realise their own ideas, the other was more completely included. The strong resemblance between reticulated and Perpendicular forms, of which we have before spoken, may be taken as an illustration of this remark. In a five-light window at Tewkesbury, we see the union of these two styles, and the steps by which one naturally led to the other. The lower part of the tracery next above the lights is filled with reticulated forms, while the space in the head is occupied with the straight-lined figure, foliated at each end, peculiar to the Perpendicular style. It was but a slight step from this to the distinctly alternate Perpendicular style. Another form of Perpendicular development was from the ogee tracery. This took place from the natural tendency to draw vertical lines from the apex of the ogee arches. This tendency is very visible in a window from Cambridge, shown in fig. 58, which is an entirely transitional window, containing many vertical lines, but not the other peculiar Perpendicular forms, the intervening spaces being filled with reticulated figures having even a Flamboyant tendency. Another fine transitional example is shown in fig. 59, which represents a five-light window in the chancel at Kislingbury, Northants. This window shows a row of alternate piercings, filled with Perpendicular patterns, above a row of quatrefoils. In the window at Tewkesbury, shown at fig. 60, we see also a combination of Perpendicular with reticulated and divergent tracery, the primary pattern being a two-light reticulated. Traces of arch and foil tracery may also be discovered in the Fenestella.

Perpendicular tracery may be combined with the Geometrical style as well as with the flowing, in so many different ways that classification and description are almost impossible. The combination is mostly effected by filling up a primary pattern of one kind with a secondary one of another. But great care is required in effecting these combinations, as a Geometrical or flowing figure thrust carelessly into the midst of an otherwise Perpendicular design has a most unnatural effect, and, on the other hand, one or two vertical lines may entirely destroy the good effect of an otherwise decorated composition.

MISCELLANEOUS WINDOWS.

If tracery be defined exclusively as originating with the lines of the millions, the figures described in circular windows can hardly be called true tracery. Yet that they *are* traceried figures it is impossible to doubt. Circular windows, with elaborate piercings, existed even in Norman architecture, and are found bearing all the peculiarities which distinguished the successive styles described in the foregoing remarks. In fact, the circular piercing was developed into a distinct form of window before the introduction of the pointed window with tracery. They were at first simply foliated, and afterwards, in the Geometrical style, would be filled either with a number of foiled circles round a central one, or a series of foliated figures, radiating from a centre circle, as in fig. 66. In the flowing style we have some very beautiful circular windows, of which we represent the extremely splendid example in the south front of Lincoln Cathedral (see fig. 61). This is in no sense a rose or wheel window. The tracery has no reference whatever to a central point. The outline is formed by two vesicæ and their spandrels, being an arrangement somewhat analogous to subarcuation in a pointed window. The tracery is extremely beautiful in itself, suggesting the idea of natural leafy forms, but being without the stem, which would be found in the mullion of a pointed window, we cannot say—beautiful as this window is by itself—that the flowing idea is the most adapted to circular windows, in which we judge that the arrangement should always bear reference to the central point.

We next present four examples of triangular windows. Fig. 62 is a window at Gaddesby, the tracery of which consists of three spherical squares doubly foliated. Fig. 63 is a rather unusual design, occurring at Catworth in Huntingdonshire, which is an adaptation of wheel tracery. Six spokes diverge from the centre, and are carried into the sides and angles of the window, the whole spaces between being trefoiled. Nos. 63 and 64 are two triangular windows from Carenton, which give examples of the adaptation of Flamboyant tracery to the triangular shape. All these figures may be found among the subordinate figures of more elaborate compositions.

Fig. 66 represents a window at Milton Malsor, occupying a square space, but in which the main figure consists of a wheel in which eight spokes diverge from the centre. The spandrels are open and foliated.

Square-headed windows are often filled with tracery in the various styles. We can, however, only represent one two-light window (see fig. 67), which is filled with very beautiful tracery of a mixed divergent and convergent character, divided by a vertical line in the middle. In some cases this vertical line is, however, omitted. Flat-headed windows are, however, far more common in the Perpendicular than in any other style.

The last class of window which we shall notice is that having a straight-lined arch. They are principally found in belfry and spire lights; and the tracery is usually of the most simple and unpretending kind. Flowing tracery properly so called is seldom found, either in these windows or in clerestory windows. A two-light reticulated design is as much as we generally find, even in the latter position. The belfry and spire openings however of our ancient churches, from their peculiar nature and extreme simplicity, often present very favourable opportunities for studying the Early styles in their greatest purity. In fig. 68 we give an illustration of a straight lined window arch at Stanwick, which is filled with a mixture of reticulated and wheel tracery, and in fig. 69 we show a window at South Kilworth, in which the design is Geometrical, with an unfoliated pointed oval filling up the space in the head left above the circle.

With these illustrations we must close our remarks upon window tracery for the present. The subject is a most extensive and interesting one, and our illustrations might be multiplied almost indefinitely. It is, however, doubtful how far it is advisable to treat upon this and like topics in an exhaustive manner, if that were even possible. The principal value of its consideration will be found in its suggestiveness, and if enough has been said to explain and illustrate the peculiarities of the leading varieties of the various styles, so as to enable our readers to enter into their spirit and reproduce with life and soul, the beautiful forms of which they are capable, we shall have fully attained the object of these remarks.

THE SOUTH KENSINGTON MOSAICS.

THE *Pall Mall Gazette* says:—"The plan proposed by the Science and Art Department for the historic illustration of the art of mosaics has had an unfortunate commencement. The *fac-simile* copy from 'The Figure of the Good Shepherd seated amongst his Flock,' which has reached South Kensington from Ravenna, the authorities of the Museum decline to exhibit, on the plea that the replica is badly executed. This famous mosaic, in the mausoleum of the Empress Galla Placidia, of a date as early as the fifth century, was rightly considered by Mr. Cole and Colonel Scott specially worthy of reproduction. Accordingly, a commission was given to Salviati and Co., who are entrusted by the Italian Government with the restoration of the mosaics in S. Mark's, to make a copy of the original; and we are in a position to state that more than ordinary pains were taken to secure accuracy. It so happens that in Ravenna resides a trusty mosaicist, trained at the Papal mosaic establishment in Rome, and of late years employed by the Government of Victor Emmanuel to guard and to keep in repair the much dilapidated mosaics of Ravenna. This man was engaged to execute for our Government the copy now in London, and the way in which he went to work was as follows. He made on the face of the original a coloured tracing, which is now in our possession. This sketch, which is of the nature of a working drawing, was executed not only to secure truth in general outline, but minute literalness in detail; it is, in fact, a cast as well as a sketch, for the indentations on its surface indicate the number, size, and disposition of the tesseræ or cubes of which the mosaic is constructed. In Italy we were told that Mr. Cole rightly deemed such details essential to the value of the historic series which the public may still hope some day to see complete. The mosaicist, in obedience to his instructions, proceeded step by step with caution; living on the spot, he was able once a day, or oftener, to correct his copy by a visit to the original, and, moreover, Salviati's director made a journey from Venice to Ravenna in order to verify the replica ere it was sent to London. Why the result has proved unsatisfactory to the authorities at Kensington it is not easy to explain, save on the supposition that they expected a mosaic of the fifth century to be as smooth, clean, and pretty as the ceramic works which the Department produces and puts up now in the nineteenth century. The making of this copy has led to the restoration of the original. The Italian Government, on hearing that England possessed the only existing *fac-simile* of an invaluable work, which might any moment fall down from the wall and be destroyed, were moved with so much envy that they actually scraped together a little money to secure its better safety. A few weeks since we saw a man and a boy on scaffolding busy on renovations, which a photograph in our possession shows are undertaken scarcely in time, for parts of the mosaic are, in fact, not mosaic, but patches of paint to disguise dilapidations. And we are sorry to add that this pernicious practice of rubbing in colour with a brush has been fatal to other mosaics in Ravenna and Venice."

THE ACCIDENT AT ABBEY MILLS PUMPING STATION.

AT the last meeting of the Poplar District Board of Works, the surveyor reported the damage done to the neighbourhood owing to the bursting of the air-chamber at Abbey Mills pumping station, referred to in our last. Mr. Sadler, a member of the District Board, contended that the Metropolitan Board had made a most glaring mistake in providing a single air-chamber at the pumping station for the eight engines which had been erected there. There should have been at least two air-chambers. The kitchens, gardens, and the lower parts of a large proportion of the houses have been flooded with putrescent and offensive sewage matter, which on subsiding leaves a deposit which would be most detrimental to the health of the neighbourhood in summer weather. Mr. E. R. Cook, representative of the Metropolitan Board, denied that that body was to blame in the matter, and said that the construction and arrangement of the works met with the full approval of the first engineers of the day. However, a large cast-iron plate had been constructed, and would be fixed in a day or two in such a manner as would enable two of the permanent engines to be got to work at once. With reference to the future, he thought the Metropolitan Board, with the experience they had had, would not again trust their eggs to one basket, but would most probably make another outlet and divide the engine power between the two, giving four engines and one air-chamber to each.

PROPOSED NEW PARK FOR MARYLEBONE.—It is proposed to form a new park for the borough of Marylebone. The site is at Hampstead, and an inhabitant, Mr. David Tildesley, has offered to contribute £1,000 towards the cost.

Building Materials and Appliances.

LIME-BURNING.

IN a former article I endeavoured to explain the nature and manufacture of lias-lime, and although I specially stated that my aim was not to describe lime-kilns, I have been taken to task by a correspondent in the last issue of THE BUILDING NEWS for not pointing out the merits of an invention of which he is the joint patentee. My non-mention of the Hoffmann kiln did not arise from ignorance, for I am fully aware of the many advantages which it possesses, but even if it had been used for burning lias (which up to the present time I believe not to be the case), I can see no reason why I should have treated of it in those remarks which were directed to the material and not to the manufacturing appliances. My intention was to have explained the chief feature of this invention under the head of lime-burning, and in reply to Mr. Wedekind I may take this opportunity of so doing.

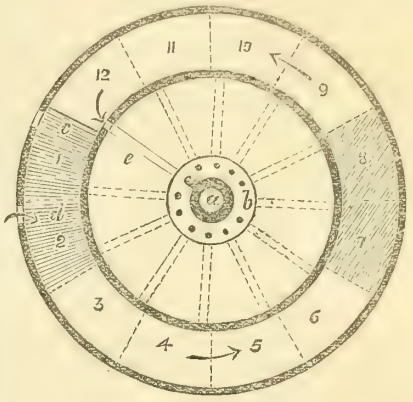
I have already pointed out the difference between tunnel-burning and flare-burning, and before commencing any reference to special forms of kiln, I may still further subdivide the methods of calcination by distinguishing between what I may call the vertical and the horizontal systems. The vertical system of calcination, which may be carried out either as a flare or a tunnel process, consists in exposing a column of chalk to the action of a vertical flame and updraught. Including as it does, therefore, all the old-fashioned kilns in the country, this may be called the old plan of burning. On the horizontal system on the contrary, which is the new plan, the flame and draught are conducted in a horizontal direction through the material to be calcined. This plan also may by special appliances be carried out in kilns either on the flare or tunnel principle, or on a combination of both of these methods.

Lime kilns themselves may likewise be divided into two classes, namely, continuous or draw-kilns and intermittent kilns. Draw-kilns are those which after being once started are kept continuously at work by drawing out the lime when properly burnt by means of draw-holes at the lower part of the kiln; the chalk and fuel in the case of tunnel-draw-kilns being introduced through apertures in the upper part. Or, in some more recent forms of draw-kilns on the flare principle, fires burning in the walls of the kiln are made to operate upon a constantly descending column of chalk added to at the top and removed when burnt from the bottom. Intermittent kilns are those which after being filled and burnt either as tunnel or flare kilns are allowed to cool in order that the lime may be removed and a fresh charge introduced. Intermediate between these two classes come certain forms such as Hoffmann's kiln, which may be characterised as a compound intermittent kiln, and others which will be noticed in due course.

In investigating the relative merits of these systems the points to be considered may be briefly stated as follows:—1. The quantity of lime acted upon at once. 2. The mode of emptying and filling the kiln. 3. The quantity of fuel employed for a given produce of lime. 4. The wear and tear upon the kiln. 5. The quality of the lime; and, 6. The facilities of working. Many of these items are of course dependent one upon another, and it will not in all cases be possible for me to consider them *seriatim*.

The kilns in use throughout the country for the purpose of producing tunnel-lime may be arranged under two heads, namely, those open at the top and those that are covered in with a dome or cone. Open kilns conical or cup-shaped in section and provided with an aperture at the bottom for the removal of the lime, being by far the most common form, and in such kilns as these we get the minimum result from a given quantity of fuel. If we consider these kilns under the various heads we have arranged for our analysis we find that firstly—The quantity of chalk exposed at once to the action of the fire is never more than from five to eight feet in depth by whatever may be the area of the kiln. In draw-kilns of this form when placed against the side of a hill we get probably the most favourable conditions for supplying, loading, and emptying the materials, as the chalk is wheeled in upon the level at the top and descends by the gradual removal of the lime to the lowest level, when it is carted away. The filling consists in simply pitching in basketfuls of chalk together with the necessary amount of fuel, and as the top is uncovered the workman can dispose them in exactly those positions where they are required. The emptying or drawing of the kiln is effected by merely opening a trap in the bottom, when the lime "runs" or falls mechanically into the carts or other vehicles for its removal. By covering in the top we at once effect a saving in fuel by keeping in the heat, but we do away with the facilities for evenly distributing that fuel among the materials to be calcined. The cone enables us to obtain a greater depth of chalk under operation at one time, by increasing the up-draught, but it involves certain evils which I shall refer to further on. The fuel consumed in such kilns as I have been describing varies, of course, greatly with the nature of the chalk or limestone, but it may be assumed to average 30 per cent. by measure, of the raw stone. In this very simple form of kiln, especially when it is used as a draw-kiln, we have probably the least amount of wear and tear, but when employed on the intermittent system the alternate expansion and contraction is very fatal to the linings, which are generally of fire-brick, and become speedily cracked and drawn in at that part where the maximum heat is obtained, namely, within about a couple of feet of the usual surface of the chalk. The quality of the resultant lime in this kind of kiln is open to the objections I pointed out in my former article, but although the colour is indifferent and the use of the chalk in comparatively small lumps is involved, the lime is generally very evenly burnt. Perhaps in the last particular, namely, in the simplicity of the operation of lime-burning, this kind of kiln takes the highest rank. On the continuous system any workman can fill in three baskets of chalk to one of coal and draw out so many bushels per diem, and skilled labour is entirely avoided. When burnt intermittently the plan of arranging the alternate strata of coal and chalk is so simple that the burners cannot get wrong, and the kiln burns itself off without any attention whatever. I may therefore briefly sum up the advantages and evils of the old plan of tunnel-burning on the vertical system as follows:—Advantages—great simplicity in the operations of burning, filling, and emptying, and little wear and tear of kilns. Evils—waste of fuel, small quantity of chalk operated upon at one time, and impure and discoloured lime.

I now pass on to tunnel-kilns in which the chalk is burnt on the horizontal system which I have called the new plan. I may take by way of example the form of kiln patented by Hoffmann for effecting this object, as, although several patents have been secured, Hoffmann's kiln is the only one which has as yet proved successful. To comprehend aright the action of this invention in its simplest form, I must refer to the accompanying diagram. As will be seen, the general plan of the kiln is circular or annular with a central chimney-shaft *a*, surrounded by a smoke-chamber *b*. The kiln may be divided into twelve or more segments by movable partitions or shields formed of wrought-iron plates as shown at *c*, and at the floor level of each of these compartments a flue as seen at *e* is taken into the central smoke-chamber *b*. Each of these flues may be opened to any extent or entirely closed by means of a conical plug-shaped damper situated over the aperture of the flue in the bottom of the smoke-chamber *b*. The form of the kiln is a continuous, low, waggon-vaulted passage having projecting piers to receive the wrought-iron divisions which form the compartments. This kind of kiln of course necessitates the employment of a lofty chimney to establish a sufficiently powerful draught. This general de-



scription will I trust, together with the diagram, be sufficient for a comprehension of the mode of working. In the diagram the compartments 7 and 8 are represented as under full fire: No. 1 is being filled and No. 2 emptied; Nos. 3, 4, and 5, are cooling down previous to being drawn; and Nos. 9, 10, 11, and 12 are being dried and gradually warmed by the waste heat carried forward from the compartments undergoing full firing. The atmospheric air needed to support the combustion of the fuel passes in at *d* No. 2, and from thence through the compartments 3, 4, and 5, and while it assists in cooling them down, it takes up a great portion of their heat. By the time, therefore, that this air reaches the part where the burning is taking place it must doubtless have acquired a very high temperature, and thus be in the most favourable state for combining with the gases from the coal. The fuel for this kind of kiln should be in a finely divided state, and may consist of small coal, breeze, or a mixture of these materials with sawdust or dried tan. It is introduced by means of numerous small apertures through the crown of the vault, and falls into vertical fireplaces formed in the chalk or material to be calcined. As will at once be seen, if I have succeeded in explaining the action of the kiln, we have here a plan of burning far superior in all respects to the old method, and one which can only be spoken of in terms of the highest approbation.

I will now analyse its working under the different heads I have selected for this purpose. The amount of the chalk which is subjected at one time in the Hoffmann kiln to the direct action of the fires is very great and approaches the maximum quantity possible. For in my diagram, if the fires in the 7th and 8th compartments are in full work, the heat from them is acting upon all the chalk between this point and the end of the 12th compartment, where the products of combustion quit the kiln by means of the flue *e*. Thus, on examining the condition of this part of the kiln, which is easily done by removing the covers of the feedholes, we should probably find the chalk in compartments 9 and 10 at a dull red heat and cherry red respectively, although no fuel had been introduced, and before reaching the flue *e* the heating value of the fuel would have become exhausted. No heat is thus lost, either in the cooling process or in what may be termed the smoking process, and therefore give Hoffmann's patent the pre-eminence in this respect. We have next to consider the method of filling and emptying, and here the patent kiln presents several difficulties. I have mentioned that the fuel is supplied through openings in the top of the kiln and falls into fireplaces formed in the material. These fireplaces are simply circular shafts about 12in. in diameter,

and require to be carefully disposed under the feed-holes. Further, in order to facilitate the draught through so large a quantity of stone, flues are required in the material. These flues are built up and arched over in rubble chalk-work; they must be carefully put together, or they may collapse in the firing and greatly interfere with the draught. It requires, therefore, skilled labour to attend to these various details, and none but a good workman can pack the arched vault quite closely, to do which, he has to throw up the latter portion of the chalk several feet above his head; when the compartment is filled, the door has to be bricked-up and plastered over with clay. The drawing cannot, of course, be commenced until the lime is sufficiently cool for one to enter the kiln, but at the best, this is very warm work. From the confined space in which the material is enclosed, and the great draught, and consequently fierce heat which is occasioned if the damper is not properly attended to, the lime sometimes gets so clinkered together that it has to be cut out with crow-bars, but this ought never to occur in a kiln which has been properly managed. The fuel being kept away from the larger portion of the material to be calcined, a considerable part of the lime, if carefully picked, might pass for flare lime, but the process, as at present carried out, cannot be properly called flare-burning. I understand that fire-clay retorts have been specified to keep the fires quite apart from the contents of the kiln, but I cannot believe this would be found to succeed. The quantity of fuel used is very small, and the saving has been stated to be fully 50 per cent. of the amount of coal burned on the old plan, and small coal and slack being substituted for good round coal, still further reduces the cost.

A point which has not received sufficient attention in lime-burning, appears to me to interfere more or less with the proper action of the fires in these kilns. The carbonic acid gas given off both by the lime and the fuel is all carried forward through the more advanced fires, and sometimes so checks the combustion, that they can only be kept alive by means of a powerful draught. Another matter which is a serious evil in this plan of burning, is that the steam driven off by the heat in the hotter parts of the kiln is again deposited in a condensed form at the very place where the stone is undergoing the drying process, previous to being burned, and in brick-kilns, this point often occasions much difficulty. But even with these objections, which have been partly provided against in a much more complicated kiln recently patented, the saving in fuel is very great. In treating of the wear and tear of the kiln, we can readily see that, although in one respect a continuous kiln, Hoffmann's patent has all the disadvantages of an intermittent kiln, namely, the liability to damage by alternate expansion and contraction, and being of an annular form, the expansion takes place in a specially destructive way, occasioning cracks in the outer wall, and great strain upon the arched roof. In point of durability, it cannot take a very high rank, and its cost in the first instance is proportionately very great.

The lime in a well-managed kiln is very uniform and good, but I am told that it takes a long time to get into the way of working the fires and flues, to ensure this result, and that in some places much core is always mixed with the lime, but we must judge the invention by its success only. Under the last head, namely, the facilities of working, I need not say much in addition to what I have already stated—skilled labour is required in the filling, and most careful and constant attention in the firing. The fuel is fed in in such very small quantities, that the stoking of the fires may be said to be perpetual, and the heavy dampers and iron partitions entail considerable trouble. In fact, the kiln needs quite an army of men to manage it, and even if there is in its vicinity a steady and uniform demand for lime all the year round, it can only be employed by manufacturers in a very large way of business. Notwithstanding these objections, it is doubtless, out and out, the best lime-kiln now in use, and for a given quantity of fuel, produces more lime of good quality than any patent process at work in this country. My account of Hoffmann's patent has occupied so much of my space, that I must reserve my remarks on flare-kilns for another article.

Gilbert R. Redgrave.

TODDINGTON CHURCH.

The Church we illustrate this week is being erected in place of an old but almost wholly modernised church in Toddington-park, between Cheltenham and Evesham. It is being built at the sole expense of Lord Sudeley. In plan the church consists of a nave 66ft. × 23ft.; chancel, 40ft. × 20ft. 3in.; south chapel, 15ft. × 21ft.; north chapel, 5ft. × 25ft. Vestry on the north side of the chancel, and a tower and spire 22ft. square, and south porch. The north chapel is erected to receive a very large monument with recumbent effigies of the first Baron Sudeley and his wife, erected some time since by Mr. Lough, as well as other monuments of the family. This chapel is groined with a stone vault of two bays, the chancel with one of three bays, and the south chapel and tower are also groined. The nave is to have a rich oats roof. The walls are faced with wrought stone inside as well as out, and are of unusual thickness, so as to admit of fine depth of mouldings everywhere. Most of the walls are arcaded internally, and a sparing one is made inside of polished lias shafts. Very great pains are being taken with the mouldings throughout the building. There will be but little carving, but the mouldings are unusually rich and varied. The whole of the work is being executed under the direction of Mr. Price, Lord Sudeley's clerk of the works, and without the assistance of any contractor. The designs are all made by Mr. George Edmund Street, A.R.A., of 14, Cavendish-place, Cavendish-square.

THE NEW STATE CAPITOL AT ALBANY, N.Y.

The site of this building, of which we give a double page illustration, is very commanding, being about 170 feet above the level of the Hudson, and has an area of ten acres. It is bounded on the south by State-street, and on the north by Washington-avenue, 100 feet in width. The land falling off rapidly to the north, south, and east, this building, with its high walls, still higher pavilions, turrets, and towers, will appear to great advantage. In the exterior composition of the design there is a general adherence to the style of the pavilions of the new louvre of the Hotel de Ville of Paris, and the elegant hall or Maison de Commerce recently erected in the city of Lyons. Without servile imitation of any particular example, the architects have endeavoured to produce a composition in the bold and effective spirit which marks these most admired specimens of modern civil architecture.

The terrace which forms the grand approach to the east or principal front, will form an item of striking architectural detail, nowhere we believe as yet attempted on such an extensive scale, at least in America.

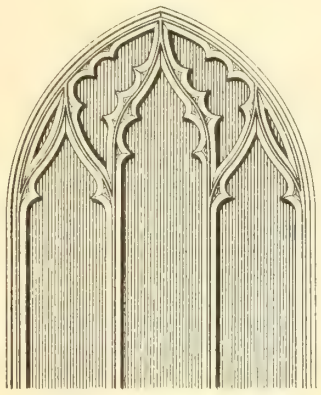
The exterior is 290 feet long north and south, and 390 feet east and west. The floor immediately above the level of the plateau of the terrace will be entered through the porticos on Washington-avenue and State-street, and through the carriage entrance under the portico of the east front. The first or main entrance floor will be reached by a bold flight of steps on the east front leading to the Loggia or Hall of entrance occupying an area of 60 feet by 74 feet, and 25 feet in height. Communicating directly with this hall are two grand staircases which form the principal means of communication with the second and most important floor. On the left of this hall are a suite of rooms for the use of the Governor and his secretaries and military staff. On the right are rooms for the Secretary of State and Attorney-General, with corridor leading to the Court of Appeals.

On the second or principal floor will be placed the Senate and Assembly Chambers, and the State Library, all of which (in elevation) will occupy two stories, making 48 feet of height. Rooms for the committees and other purposes will also be placed upon this floor. The Senate Chamber will be 75 feet by 55 feet on the floor, with a gallery on three sides of 20 feet in width. The Assembly Chamber will be 92 feet by 75 feet on the floor, surrounded by a similar gallery, which in both Chambers largely increases the areas of the upper portion. The Library will occupy the whole of the east front of these two stories, and will be 283 feet long and 54 feet wide. This will be the most attractive room in the building, and perhaps in the world. Its large area and lofty proportions, its views toward the north, east, and south, overlooking the city, and bringing in the Valley of the Hudson and its western slope for miles in each direction, will make it a favourite place of resort at all seasons of the year.

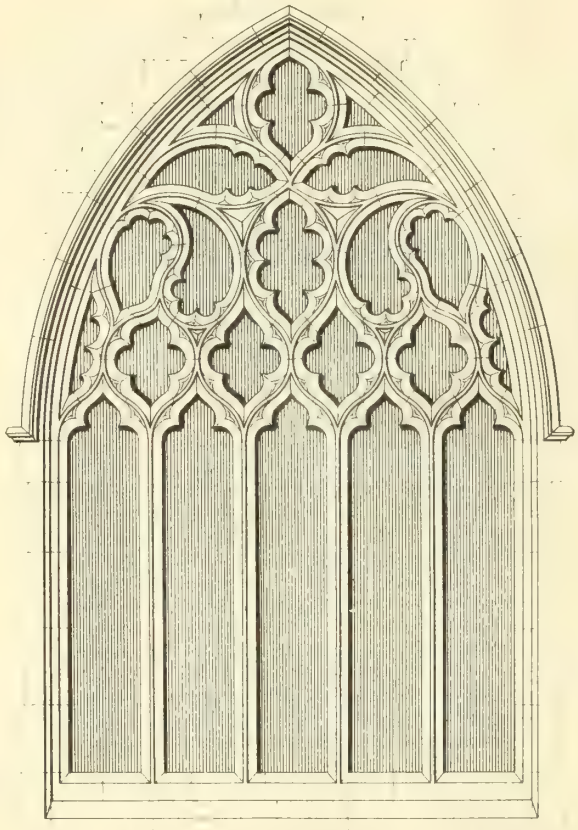
The main tower is 66 feet square, and about 320 feet in height. In the centre of the building will be an open court of 137 feet by 92 feet. This court will be a grand and attractive feature, being treated in the same manner as the exterior fronts, and will no doubt ultimately have its fountains, and be surrounded with statuary. The plans of the foundations have been prepared with great care. The entire structure will weigh 150,000 tons; but the great inequalities in the heights of the various walls, and the distribution of the enormously heavy fire-proof floors, and roofs sometimes laden with deep snows, bring very unequal weights upon the parts of the foundation adjacent to each other, and without this great care they would settle unequally, and crack the walls, as is so frequently seen in modern private, and even in many of our public buildings. The stone foundation of the walls commences on concrete, and is made of large blocks of close-cut limestone of from two to six tons weight, laid in regular courses, the first one of nearly the width of the concrete, and each successive one narrowed by offsets, until the wall is contracted to the width necessary to support the superstructure, arranged so that they will afford an equal bearing on each side of the line of the centre of gravity of the walls and the weights which they are to sustain. The work has been carried on with very rapid progress. The commissioners appointed for the erection of this building are Messrs. Hamilton Harris, John V. L. Pruyn, O. B. Latham, James S. Thayer, Alonzo B. Cornell, William A. Rice, James Terwilleger, and John T. Hudson. The architects are Messrs. Fuller and Laver, of Albany, and Mr. W. J. McAlpine is the engineer.

OBITUARY FOR 1869.

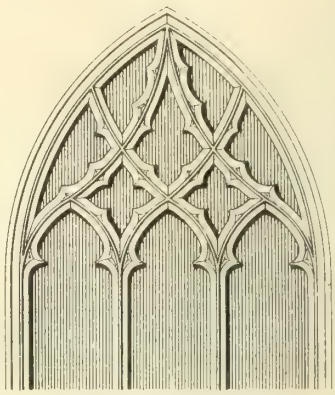
1869.		Age.
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„	3 Nyström, A., Swedish Architect	75
„	5 Smith, Geo., Architect	86
„	10 Huet, P., French Artist	65
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„	15 Hesse, N. A., French Artist ...	74
„	28 Todd, Rev. Dr. J. H., Archæologist	64
July	— Richardson, E., Sculptor	57
„	13 Farthing, W., Curator of Architectural Exhibition	—
„	29 Jukes, J. B., Prof. Geologist	58
Aug.	1 Crawford, W., Painter	44
„	— Warner, Chas. (senior partner of the well-known firm of J. Warner and Sons)	—
„	2 Roebling, J., American Engineer	53
„	18 Hotchkiss, American Artist	35
„	26 Leys, Baron, Belgian Artist	54
„	30 Lamb, E. B., Architect	63
Sep.	26 Foggo, Geo., Painter	76
Oct.	24 Hébert, Pierre, French Painter	65
„	28 Bruce, J. Archæologist	67
„	— Borel, M., Chief Engineer of Works of Suez Canal	48
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„	30 Challoner, C., Liverpool, Timber Merchant	79
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„	— The Oberbaurath Langhaus, German Architect	89
„	15 Tenerani, Roman Sculptor	81
„	— Lead, Leonard, Artist in Pottery	82
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„	— Creswick, T., Artist	68



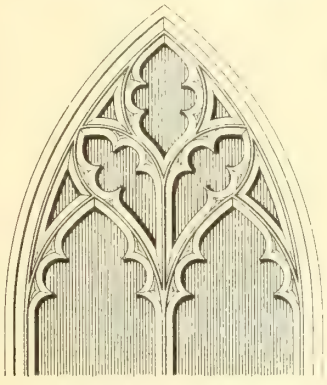
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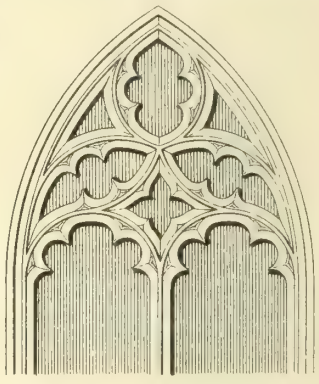
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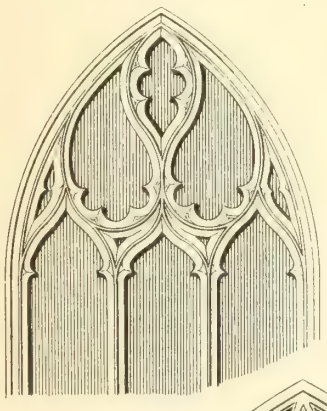
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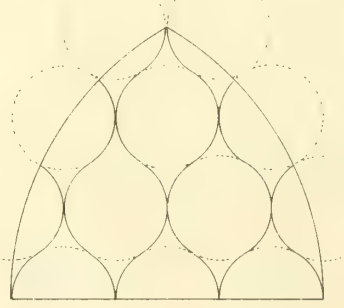
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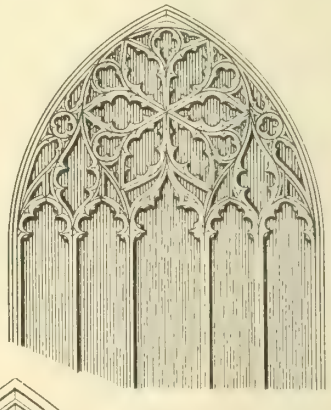
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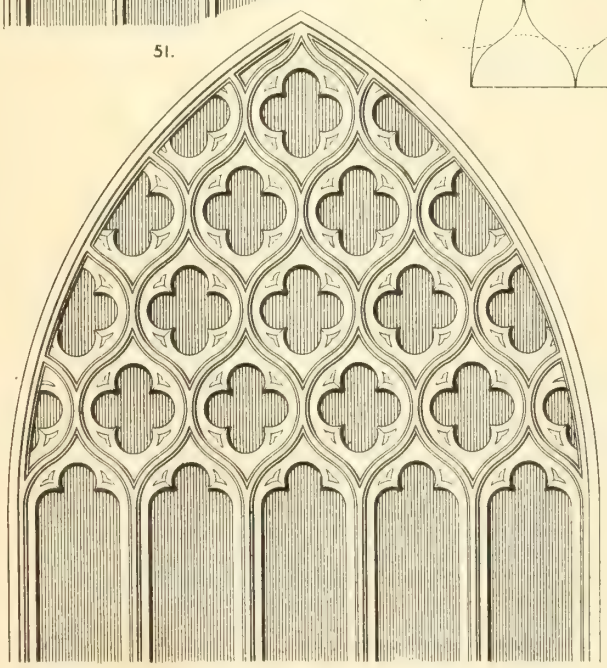
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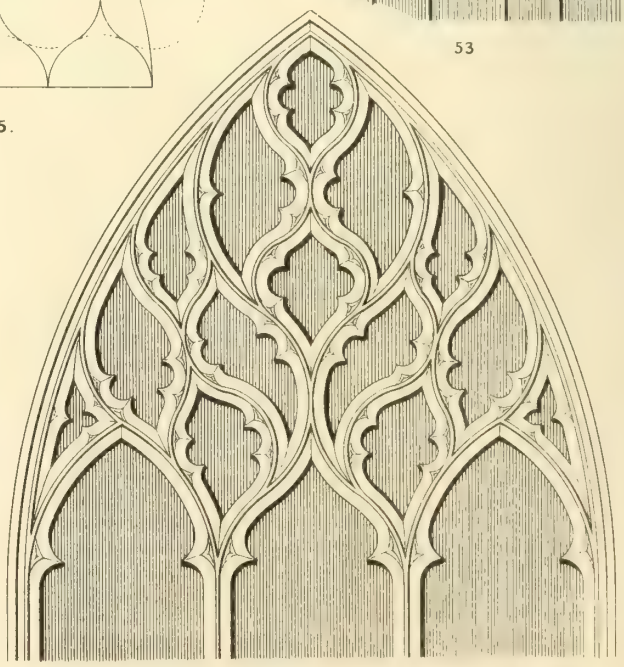
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ILLUSTRATIONS OF WINDOW TRACERY, No. IV.



The Capitol, Albany, N.Y. FULLER & LAVI, ARCHTS.

Printed by Waterlow & Sons

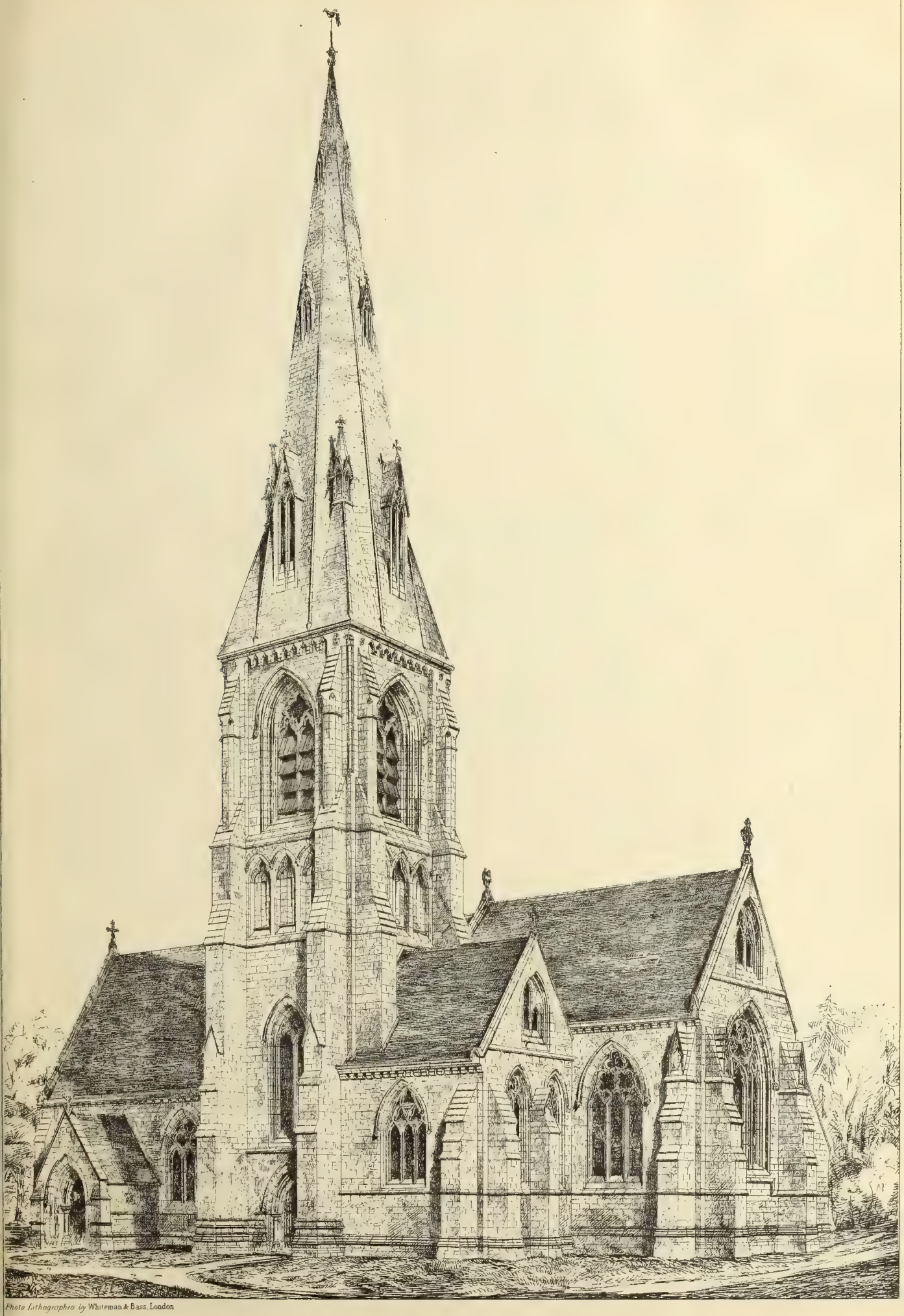
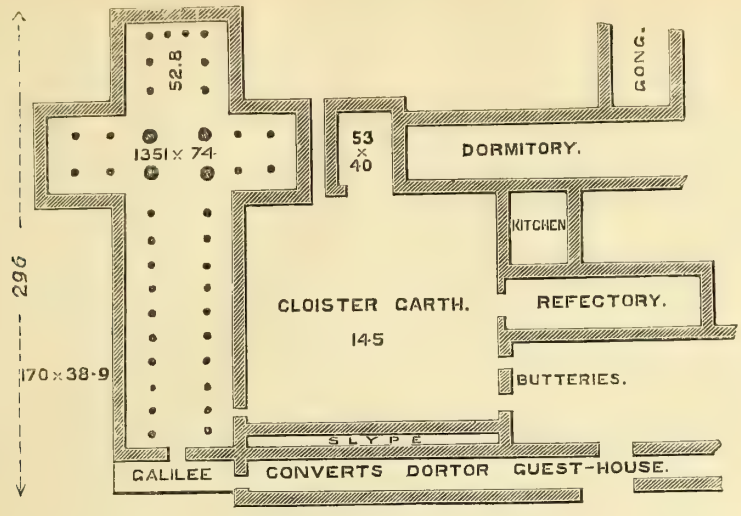
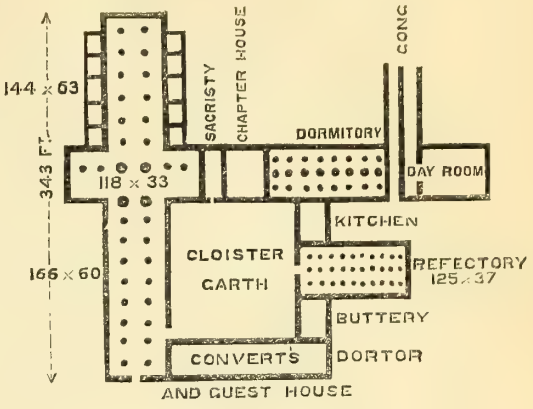


Photo Lithographed by Whiteman & Bass, London

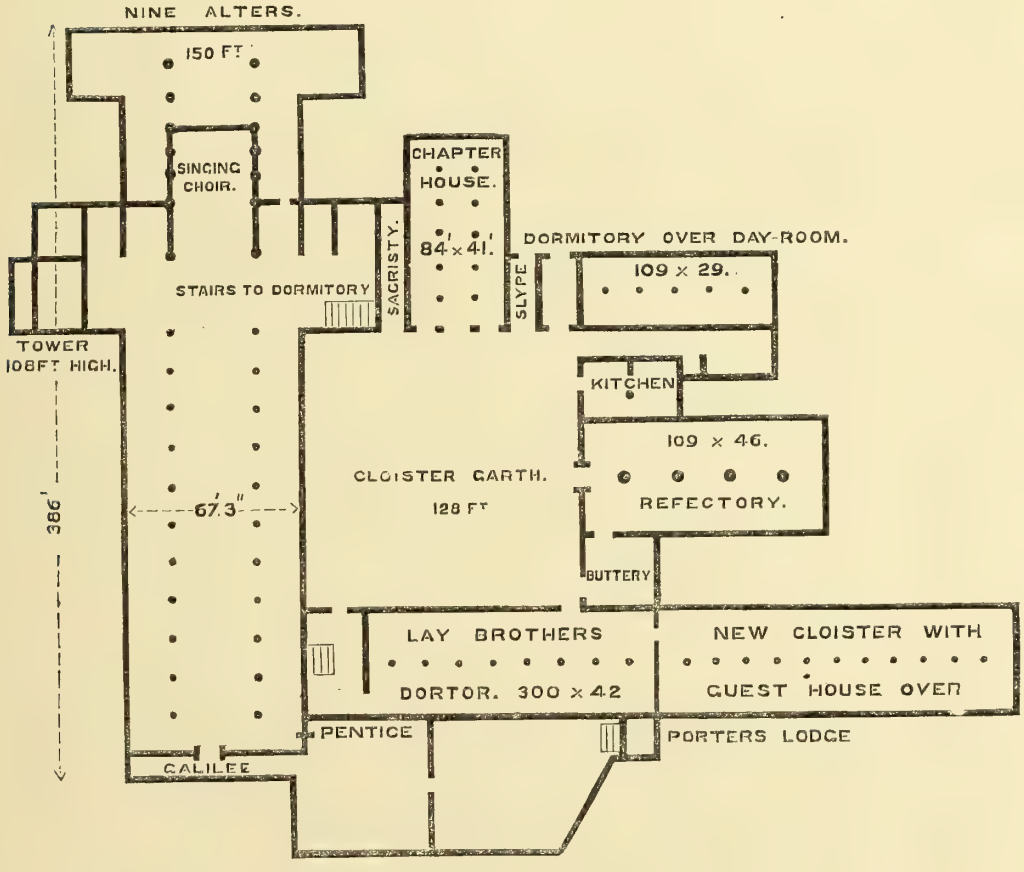
S. E. view of Church in Toddington Park.—G. E. STREET, ARCHT.



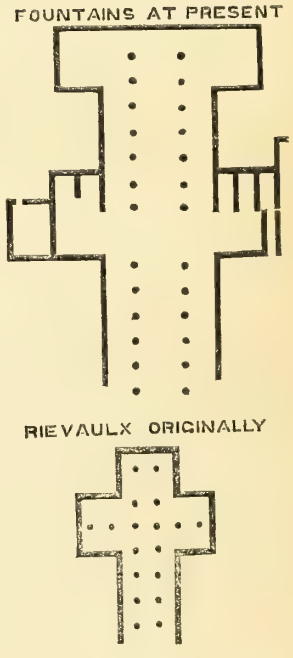
BYLAND.



RIEVAULX



FOUNTAINS



THREE CISTERCIAN ABBEYS OF YORKSHIRE.

YORKSHIRE abounded in minsters of the great Cistercian order. Its rich meadows and secluded valleys, sheltered by wooded hills, and watered by clear streams, offered homes to the recluse and farmer monks of an order which loved secluded sites. Among the most lovely of English abbeys may be mentioned Rievaulx and Fountains (two of the grandest yet surviving, even in ruin), whilst Kirkstall, Byland, and Roche still present many features of the highest interest, and the more scanty remains of Sallay and Jorvaulx are picturesque in decay.

There are some very remarkable peculiarities in the two former buildings; both require little more than a roof to enable the renewal of holy offices within their deserted walls. Rievaulx, in its magnificent choir, presents the rare, perhaps the unique, feature of a vast triforium, and huge flying buttresses which beyond a doubt enclosed lateral chapels, as in continental examples; its axis also deflects from the English system of orientation. Both in height and features it bears the impress of its original builders from France.

Fountains offers also the fragment of a galilee at the west end, narrow as a Byzantine narthex, like one at Byland formerly; a superb eastern transept which contained nine altars; and a tower attached to the north wing of the great transept. Kirkstall, a daughter of Fountains, shows how its choir was arranged before its reconstruction. Abbey Dore likewise had an eastern range of five chapels; Byland ended in a beautiful arcade of five arches opening into the easternmost bay or processional path; Croxden gloried in a coronal of five polygonal chapels; and Beaulieu, built on the model of Pontigny, terminated in a superb apse and processional path; but all these trespassed on the normal type of the Cistercian minster. Furness also had a western tower, and Abbey Dore possesses a tower attached to the south wing of the transept.

But the ideal of a Cistercian church embraced a long nave, a dwarf aisleless choir, a low central tower, and a transept divided into two or three chapels in each wing. In many cases the choir screen was erected athwart the nave, three bays from the crossing at Kirkstall, Jorevalle, and Netley, and originally at Fountains, although it was subsequently placed at a space of only one bay distant from the crossing. There was no eastern Lady Chapel, as all minsters of the order were dedicated to S. Mary.

The conventual buildings were usually on the south side of the church, the exceptions being at Tintern, Ford, Buildwas, Dore, Melrose, &c. The refectory ordinarily stood north and south, as at Beaulieu, Fountains, Rievaulx, Jorevalle, Ford, Kirkstall, Croxden, Tintern, Netley, and Byland. Circumstances of site probably determined the exceptional position of east and west. On the west side of the cloister there was usually an enormous range of building consisting of a cloister in two alleys, and a lay brother's dormitory and guest-

house, in one line above it. At Fountains it was called the New Cloister, and no doubt was indispensable in winter, as the Cistercian cloister garth was enclosed with only a pentice roof carried on timber posts. Occasionally a large yard or slype intervened between this range and the cloister wall, as at Buildwas, Beaulieu, and Dore, indicating its destination as a guesthouse; whilst at Fountains external stairs erected over the porter's lodge enabled guests to arrive without disturbing the monastic order, and a passage, as at Netley, Beaulieu, and Jorvaulx, communicated with the south aisle of the nave.

The *refectory* was not unfrequen tly subdivided by ranges of pillars. There were three alleys at Rievaulx and two at Fountains, and it would seem that the dormitories were often arranged in a similar manner. The gong usually runs eastward of the dormitory. The kitchen is generally on the east side of the refectory, and the butteries are placed on the west of it.

The *abbot's house* was usually on the east side of the dormitory, consisting of a great hall and chapel, kitchen, and domestic adjuncts, and may be traced at Jorvaulx, Fountains, and Buildwas.

At Kirkstall there was a *forensic parlour*, like a tresaunt, or slype, which corresponded to similar chambers or alleys at Worcester (Benedictine) and Kirkham (Austin Canons), for communication with tradespeople, servants, and guests. At S. Gall, in the ninth century, it was called also the vestibule.

The *choir* was originally but of one span, as at Furness, Ford, Boyle, Melrose, Kirkstall, Buildwas, Valle Crucis, and Roche, or was of two bays as at Merevale, or three bays, as at Jorvaulx, Byland and Tintern, or of four bays, as at Netley and Waverley; but this gradual elongation yields in size to the eastern ends of Croxden and Beaulieu, the five bays and nine altars of Fountains, and the three bays and double processional path of Dore, the seven bays of Rievaulx, or the nine bays of Sallay.

The *chapter house* was divided into alleys, two at Kirkstall and three at Beaulieu, Sallay, Netley, Croxden, Tintern, Fountains, Jorvaulx, Buildwas, and Valle Crucis. It had three bays at Valle Crucis, Furness, Buildwas, Netley, four at Kirkstall, Jorvaulx, and Tintern, five at Sallay, and six at Fountains.

Usually the *sacristy* intervenes between the chapter house and south wall of the transept; and not unfrequently there is a *tresaunt*, or small chamber which served probably as a lesser regular parlour, and aumbry for the cloister library between it and the east alley of the cloister. At Buildwas, Tintern, Fountains, and Jorvaulx it is a chamber southward of the chapter house; but it occurs in its ordinary position at Rievaulx, Beaulieu, and Croxden; the outer recesses of the chapter house at Furness probably served the same purpose.

The *transept* was divided into eastern chapels in each arm—three at Kirkstall and Waverley, two at Roche, Jorvaulx, Fountains, Rievaulx, Merevale, Valle, Crucis, Byland, Tintern, Croxden, Netley, Boyle, Melrose, and Sallay, but only one at Dore; whilst at Furness, there were three in the northern wing, and a single altar in the south arm.

The *dormitory* normally occupied the east side of the cloister extending over the sacristy, chapter house, slype, and a long vaulted range of chambers subdivided into a parlour and a day room or calefactory provided with a fire place; a flight of stairs led down into the transept through the library, which was often over the chapter house.

With these observations, which have been given more in detail in my "Sacred Archæology," I proceed to give a short account of a recent visit to the three famous Cistercian Abbeys of Yorkshire—Rievaulx, Byland, and Fountains. The second of these is easily reached from Coxswold station, and the third from Ripon; but the first is somewhat inaccessible. It is three miles from Helmsley, which again is distant from Gilling station about five miles; an omnibus forms a rare accommodation, as it only goes from Helmsley early in the morning, and returns late in the evening. A letter addressed to Mr. John Wright, landlord of the best inn at Helmsley (and a very comfortable hostelry it is), will, however, provide a carriage at Gilling Station. A very pretty drive it is, skirting Duncombe Park, and commanding views in the direction of Kirby Moorside. The drive to Rievaulx is not of much interest; the carriage stops at a gate in a field, and the traveller enters upon a superb terrace of the greenest and smoothest turf, with an Ionic temple at each end. He is conducted to the brink of this broad long lawn, and then a sight unrivalled lies below his eyes; a steep precipice clad with forest trees sinks down abruptly into a deep valley. On the other side are wooded hills curving round towards the south-west, and permitting the silver Rie to steal along the grey walls of the ruined minster, so far beneath, that imagination at first sight recreates it in its perfection, or rather the eye fails to see that all is a wreck. A winding and very sharp descent by stairs and paths leads into the little village, red-tiled and whitewashed, and past the scanty remains of the lesser guest house and the almonry. An ugly red railing surrounds the minster; the whole nave (160ft. in length) is gone, and trees and mounds only show where once stood the grand range of pillars and aisles of the church, and the fine mass of building in two storeys allotted to the lay brothers and the guests. On entering the cloister garth is seen the noble archway which led into the splendid refectory which formerly was a hall divided into three arcades, 125ft. long and 38ft. in breadth. On the west side are traces of the reader's pulpit. It must be remembered that the monks sat at side tables, not in the centre of the hall. The whole of the other conventual buildings are marked out by rugged heaps of stone, grass-grown, and crowned with trees. The transept at either end has a group of three tall lancets, and the eastern tower arch soars to a height of 75ft., but beyond, shorn of its aisles, and all but two of its grand flying buttresses, which strode out wide to support the stone vaulting, appears the unrivalled choir, measuring 144ft. by 63ft. Its double tier of triplets at the east end, its long line of couplets in the clerestory, and its doubled windows in each bay of the triforium, with beautiful geometrical tracery, and the arcade resting on pillars, wrought with infinite mouldings. In the flying buttresses remaining may be seen the square openings for a wall passage, and twin groups of shafts, and the springing of arches which spanned the windows of the outer chapels, which, from the weather mouldings, seem to have had gabled roofs. Rievaulx was the earliest Cistercian Abbey, founded in Yorkshire in 1131, one year before Fountains, and forty-six before a stone was laid at Byland, and neither ever came near in majesty the eldest English daughter of Clairvaux. The conventual buildings had been completed in 1153, when the founder, Sir Walter Espec, was buried in the white habit of the order before the door of the chapter house. In 1136 monks from Rievaulx began the fair abbey of Melrose. On the south-east side of the choir is a turret with a vice leading once to the triforium, now ivy-clad, and with steps not to be carelessly mounted. The whole church was 343ft. in length. The pillars of the crossing are chamfered off at some height to admit the canopies of the monks' stalls. The enormons size of the choir was an infringement upon the ordinary dimensions, which was also followed at Sallay, Fountains, and Beaulieu.

A very rough drive up stony hills, across a rough wild moorland deep in ruts, but brilliant with heather bells, and then down a long descent between grand mountainous hills, conducts to the Abbey of Byland, *bella-landa*, fair land. A trout stream brawls through the valley, and craggy highland and rolling russet heights frame in the ruins, solitary as the most recluse of the most eremitical order could desire; and removed to this site because at old Byland the bells of that church and Rievaulx chimed together inharmoniously, like S. Mary's Minster and the cathedral at Winchester. Little remains of the noble church, except the west front, the basement story of the nave-aisle, and transept on the north, the east end of the choir, and a fragment of the southern arm. Narrow semicircular windows, slender shafts, a plain corbel table, and shallow buttresses betoken an early date; whilst Pointed arches in the triforium and clerestory of the south arm, recal the fact of the existence of a blind story as at Rievaulx. But the prominent feature left is the fragment of the great rose window, the arcade pierced with three lights, and three western doorways forming a picturesque picture when seen through the round archway of the court gate. The portions of conventual buildings require a practised eye to reset them into their true plan, as they are almost hopelessly covered over by the soil. The high altar slab is now placed in a summer house at Myton, that of Rievaulx (horrible to relate) serves as a table for tourists! When will persons of education cease to desecrate the site of God's broken altars by vulgar pic-nics, ramble indecently among the ruins and dust of the fallen sanctuary, and set a scandalous example to others with less opportunities of knowing what is right? A few weeks since a friend saw a party eating their lunch in the Lady Chapel of one of our finest minsters! Public exposure is our only hope, for sneers and unseemly language are too often the retort now to private remonstrance and gentle appeals. At Fountains doors are happily placed throughout the church, and a well-trained, intelligent, and watchful guide precludes all improper conduct or desecration. At Byland, a woman who sells good photographs stops the visitor in the road, who enters his name in a book, and pays a shilling; at Rievaulx a gamekeeper or gardener takes a gratuitous fee; but in neither case is any supervision of the tourist made. At Fountains names are entered and shillings paid, but a bell is immediately rung and a guide is in attendance.

Fountains is the most perfect ruin in England, the whole ground-plot retains its buildings in such a condition that they can readily be allotted to their uses, although, of course, there are many portions which must remain without their destination being ascertained, having served as chequers or houses of office, or been transferred to other uses at subsequent dates. Everyone who has really studied conventual arrangement is most ready to admit the impossibility of giving a reason for every detail, and reluctant to make guesses. The buildings were burned in 1140, but the church was rebuilt or restored after 1204; and an imposing pile they form. The approach is through a park exquisitely kept, and a walk of half a mile beside the pretty stream of the Skell, between tree-clad banks and along a gravelled road, is hardly in keeping with an approach to a sad ruin, and yet under certain conditions of light, the tall transept tower, the long front of the nine altars, or the solemn nave, appear as if entire; in fact, there was much in the boast of an honest Yorkshireman—"If we had Fountains at Scarborough, we would soon put a roof on;" even now, what a noble Theological College might be framed out of the buildings—what a monument of piety and magnificence would such a restoration be, and what an example to others to restore His own to God again! Everyone knows Fountains through photographs or drawings, and yet there are portions of it of an interest unknown to most. That little fragment of arcade which formed a part of the western galilee; the porter's lodge under the stairs leading to the guesthouse over the "new cloister" or

ambulatory as it is now called ; that rare feature. the nine altars rivalling its one compeer in majestic Durham ; the tower—a sign of the relaxed discipline of this order and its growing pride and wealth—are perhaps the most prominent, but the artist, the architect, and archæologist will find on every side, in every chamber and mass of foundations, new sources of inquiry : the fireplace and round chimney in the kitchen, the stairs in the south nave aisle ; the broad refectory (109ft. by 46ft.) once parted by two arcades, with its torso of a wall pulpit ; the arrangements of the infirmary, hostries and abbot's house, the tesselated pavement where the high altar stood, the bridges, dormitories and gong, would suffice to while away many a long summer day, even if the minster itself were left unvisited. One curious mistake has been made hitherto with regard to the apertures, still visible, where the rood loft stood, that they were used for urns on acoustic principles to swell the volume of the organ ; as if that instrument existed of considerable size in monastic houses, or was ever placed in such a position, which was chosen after the Reformation, when roods were destroyed by the hands of desecration. The real fact was they were placed under the altar of relics and served as a place of safety for the reliquaries in times of danger. The processional stones in the nave have unfortunately disappeared. The frames of the east and western windows show how in the 15th century the abbots loved to replace the stern Norman or graceful Early English lights by formal Perpendicular tracery. All accounts of the abbey also fail to point out that the monks' dormitory extended over the day-room, and that they passed across the library over the chapter house by a staircase into the transept ; whilst the lay brothers slept in the dorter on the west side of the cloister, and had stairs into the nave, and the guests in the southern part beyond the porter's lodge had their separate staircase and special door opening also into the nave, a pentice securing them from rain and wind.

In point of beauty of situation, Rievaulx is far superior to Fountains, and we cannot doubt that its vaster and loftier church, its triple-aisled refectory and day-room, worthy of their adjacent buildings, must have outshone in magnificence a minster which in popular estimation has long cast it into comparative shade, because more readily accessible and presenting a more complete appearance.

In the Public Record Office is preserved a grand scheme of Henry VIII. for a cathedral at Fountains, and another for Guisborough. Yorkshire thus would have possessed three cathedrals.

MACKENZIE E. C. WALCOTT, B.D., F.S.A.
58, Belgrave-road, S.W.

ARCHITECTURAL ASSOCIATION.

AT the usual fortnightly meeting of this Association, held at 9, Conduit-street, Hanover-square, on Friday evening last, Mr. R. Phené Spiers, Vice-President, in the chair ; a paper by Mr. Blanchard Jerrold was read by Mr. J. W. Fogerty, on "Art applied to Industry in France, as Promoted by the new Association of Art Manufacturers." The author sent a letter begging to be excused from attending personally to read his paper, on account of failing eyesight. After a rather long preface, in which the past and present condition of art in France were compared (the substance of which appeared in THE BUILDING NEWS for September 17th last), the author said :—

"Stimulate an energetic spontaneity in individuals towards the beautiful and the useful," the French Emperor said to his subject-exhibitors on their return home from the Great Exhibition of 1862 ; and leaders among them drew up the constitution of the Central Union of the Applied Arts. This Central Union is an independent association of artists and art manufacturers ; and it owes its birth, not only to the encouragement given by the Emperor ; but also to the grave facts which the Count de Laborde comprehended in his report to the French Government on the Exhibition of 1851. The year 1851 taught the French to be busy over the defence of their laurels as art manufacturers. Count de Laborde warned his countrymen that, jealous of the art-fame of France, England and other European nations were imitating her popular drawing schools, and other means of raising generations of scholarly and tasteful workmen and designers. In the interval between the Great Exhibition of 1851 and 1855 the applied arts progressed extraordinarily in England and Germany ; and the French, surveying the Palais de l'Industrie, saw that the distance between them and their competitors had been lessened. Two years after the original International Exhibition, the French jurymen sent to London declared that France was in danger of being surpassed by the English in the field which had been once exclusively hers.

The Union of the Applied Arts, then, may be fairly regarded as an independent association of leading French art manufacturers, who have been stimulated to extraordinary activity by the recent art energy of England, and particularly by the splendid presences made by the Mintons, the Elkingtons, the Copelands, our glass and hardware manufacturers, and the busy airs of the South Kensington Museum in 1862 and 1867. So regarded, it is specially interesting to us, who are to be affected by its success ; to be kept, in short, at that distance behind French art-manufacturers which we occupied before the Exhibition of 1867.

The promoters of the Union have stood well to their original plan ; and if they have not developed it yet to the extent to which they contemplated two years ago, they have only paused for a surer spring. Waiting for the favourable opportunity for the foundation of their college (to which I drew the attention of the English art-public in 1867), they have steadily carried forward their design of bringing together the elements of an art-manufacturers' museum in the *Marais*, and of encouraging their *confrères* to produce serious works for the occasional exhibitions. France has been long since provided with free elementary art-schools, which have constantly developed generations of art-workmen, and occasionally produced great artists. The highest teaching in art is within the reach of the poorest citizen who discovers genius. The walls of the Palais de l'Industrie are covered with the drawings of the free schools ; but, until this Union was devised and set in motion, a link was wanting in the chain, according to the orderly minds of our neighbours and rivals. The Museum of Art applied to Industry must complete the Conservatoire des Arts et Métiers, and there must be courses of special instruction of the arts applicable to various trades. As proof of the desirability of the Union, the Jeanselmes, the Fourdriniers, the Derolles, and the Christofles pointed to South Kensington, and besought their co-manufacturers to see whether it would not be possible to raise a grand institution in France, in complete independence of the Government, as hinted at by the Emperor. "Let us cultivate the beautiful," they said, "in conjunction with the useful, without a cocked hat at our garden gates."

The Union which is now flourishing, and doing its best to put the old distance between the French art-manufacturers and the English (in which endeavour we shall take the very best care, I trust, it shall never have the shadow of a success), is thus an independent association of leading Frenchmen, who are not beholden to the Imperial Government for aught save permission to establish their headquarters in the ancient and deserted Place Royale. The association possesses the foundations of a retrospective and contemporary museum, and a library of books on ancient and modern art, where the student and the workman may consult authorities, and have the help of cultivated attendants. Courses of lectures and lessons, and general and special exhibitions of the applied arts, complete the means of the association for attaining its ends. The association has entered upon its mission of national competition with generosity ; for correspondence is to be held with foreign centres of art-industry, and the exchange of models, &c., is to be invited—an international courtesy which, if I remember correctly, Mr. Henry Cole proposed in 1867 to the possessors of reproducible art treasures of all nations. The founders and their friends found the money necessary for the enterprise, and the reward for the subscriber of 100 francs or upwards was the inscription of his name upon the bronze tables of the association as a *co-fondateur*. In forming this association the original executive committee applied for patrons in a direction which would not have been adopted by an English committee in search of distinguished headings to a prospectus. M. Gérome was asked to accept the title of *Conservateur* of the Union Museum. The patrons are Barye, the famous sculptor to whom the bronze-workers of France are so deeply indebted ; Guillaume, sculptor ; Albert Jacquemart, Michel Chevalier, and a senator or two—acceptable on account of other functions in harmony with the objects of the Union. We should have dressed our prospectus with a few peers, and thrown some distinguished artists in as utilities ; and in this very difference there is a certain indication that the art-sense has not yet penetrated the mass of the British public.

Passing from the list of patrons to that of working committees, we find an eminent architectural decorator, M. E. Guichard, president of the Union ; and Chocqueel, carpet manufacturer ; Falize, senior, jeweller ; Eneste, junior, hardware manufacturer ; Hermann, engineer ; Lefébvre, lace manufacturer ; Mazaroz-Ribalier, artist cabinet-maker ; Marieuvral, artificial flower-maker ; Mourez, carver and gilder ; Rouseau, porcelain manufacturer ; Turquetil, paper stainer ; Veyrat, goldsmith ; and Renard, senior, builder—the directing minds gathered around him.

It is because I have held close relations with these leaders of the Union from its foundation, that I am anxious to make known the good they have effected as an independent body in reviving the art-energies of their countrymen ; and to commend the still more important work they are preparing for the elevation of art-manufactures among all the nations that may choose to join the noble institution, on the details of which years of anxious consultation have been already spent. This institution is to be called "The International College of the Applied Arts" (*Le College International des Beaux Arts Appliques à l'Industrie*.

I have seen the plans of the College, discussed the detail of it with the President of the Union, Monsieur Guichard (whose treatise on domestic decoration I venture to commend to the members of the Architectural Association), and entreated the founders of it to rely on the cordial co-operation of all English authorities who are interested in the propagation of art-knowledge in Great Britain. I need only observe here that the International College will welcome the students of every nation ; that its terms for residence and non-residence will be on a scale to meet the most modest purses ; that its plan will embrace every kind of technical education, and that it will be governed in that liberal spirit which declares art to be of no country, and the beautiful to be a shrine at which every sect and race may kneel in neighbourly fashion.

There was but a short discussion on the paper, the attendance being very thin. It seems almost a mistake to have a meeting so near to the Christmas holidays. The Chairman concurred with the general tone of Mr. Jerrold's paper, and dwelt upon the apparently innate feeling for art which is found in even the lowest classes of French workmen. Mr. Douglass Mathews thought that no efforts which could be made for furthering the artistic education of working-men would succeed until the restrictive policy of trades' unions was abandoned. At present, these unions had a detrimental effect on workmen and workmanship, for under their *regime*, no inducement to excel in his work was held out to the careful and studious workman. Votes of thanks having been passed to the author and reader of the paper, the meeting adjourned.

INSTITUTION OF SURVEYORS.

AT the ordinary general meeting held on Monday, December 6th, the following names were read and passed to be balloted for on January 24th, 1870, viz. :—As Members—John Edward Poundley, Black Hill, Kerry, Montgomeryshire ; George Rawlence, Salisbury. As Associate—Andrew Johnstone, 25, Gresham-street, E.C.

The following Donation to the Library was announced.—Various Prize Essays, by Clement Cadle ; also a Donation of £3 3s. to the Library Fund, by G. H. Appleby. A vote of thanks was unanimously given to the various donors.

The adjourned discussion on Mr. Hope's paper, entitled the "Distribution and Agricultural Use of

Town Sewage," was then resumed; many members took part, and it was again adjourned to Monday, January 24th.

The following candidates were balloted for, and declared duly elected, viz.—As Members—James Girdwood, 49, Pall Mall; William Murton, Tunstall, Kent; William Webb, Tunstall, Kent. As Associates,—Hon. H. W. Petre, Springfield, Essex; Henry Vulliamy, 63, Old Broad-street; William Wilson, 4, Victoria-street.

The next meetin will be held on Monday evening, January 10th, when a paper will be read, entitled "The Enfranchisement of Copyholds." by Mr. Edward Smyth. The chair to be taken at eight o'clock.

The following candidates will be balloted for, viz.:—As Members—George Bridge Hilliard, Chelmsford, Essex; Frederic Chancellor, Chelmsford, Essex. As Associates—Thomas Twining, Wing, Bedford; Ralph William Clutton, Hartswood, Reigate; William Jeeves Crawley, 10, Waterloo-place.

ARCHÆOLOGICAL.

THE PALESTINE EXPLORATION.—A Jerusalem letter reports that Lieut. Warren's researches have now led him to the north-east angle of the Haram wall, but he and all his party have, according to the latest accounts, been compelled by ill-health to retire to the Lebanon. He has found the Pool of Bethesda to be a real reservoir, concreted and plastered, with an overflow through a remarkable stone chamber in the wall. Phœnician characters have been traced on the stones. A valley, the existence of which has hitherto remained unsuspected, has been traced at this corner of the Haram. These discoveries have now almost exhausted the Haram walls, and archæologists will wait in anxious expectation until the party is allowed to commence operations within the Haram area itself.

BANGOR CATHEDRAL RESTORATION.—The discovery of many details of great antiquity and interest in the course of the restoration or rebuilding of the transepts, now progressing, has thrown so much light upon the original character and beauty of this historic pile that the committee are determined to spare no effort towards carrying out, under the able guidance of Mr. Gilbert Scott, the valuable hints thus unexpectedly offered them. The following is an extract from a letter of Mr. Scott to Mr. Morgan, the clerk of the works:—"This exhuming and restoring to their places the fragments of the beautiful work of the thirteenth century—reduced to ruin by Owen Glendower, used as mere rough material by Henry VIII. and re-discovered by us four centuries and a half after their reduction to ruin—is one of the most interesting facts I have met with in the course of my experience. Its carrying out to perfection is a matter of great historic and artistic importance, and demands every effort and all the study and thought which can be brought to bear on it, with a view to ensuring the perfect fulfilment of the task we have undertaken."

A RELIC OF EARLY CHRISTIAN ART.—A few days since we (*Observer*) had an opportunity of examining one of the most interesting relics of Early Christian art which is probably to be met with in Europe. It is the head of Christ in *alto-relievo*, in Carrara marble, enclosed in a frame-work of Rosso Antico marble. The head is treated in Classic style, and the expression of the features is benign and divinely majestic. In its general outline it resembles the head of Christ, as represented in the Raffaelle school of painters. The present owner of the work states that it, with many other antique carvings, was found during the progress of some excavations made in Rome by Signor Ammendola, with the view of erecting a fountain in the grounds of his residence. At a considerable depth below the surface, an entrance to one of the large Catacombs was discovered. It had evidently been undisturbed for centuries—coins, marble columns, statues, and other works were found. Its great antiquity is proved by the symbols which are carved on the framework of Rosso Antico marble, among which is the fish, the earliest of Christian symbols. Apart from its merit as a work of art, the head of Christ referred to is invaluable as a relic of the early Christian era, and it is to be regretted that the *bas-relief*, being in private hands, is not placed in a position where its extreme beauty and great antiquity might be seen and appreciated by all lovers of art.

Building Intelligence.

CHURCHES AND CHAPELS.

ST. JAMES'S, ALDGATE.—A dangerous crack has been discovered in the north wall of this church, imperilling, it is feared, the whole structure. The fissure is so complete that the people in the premises which abut on the church can see through into the building. The churchwardens have promptly closed the church for the purpose of a careful official examination.

HAMPSTEAD.—On Friday last the Bishop of London consecrated the new church of S. Stephen, at Hampstead. It consists of a nave with six bays, supported by Mansfield-stone pillars, intersected by a tower, and terminated at the east end by a polygonal apse. This at present is the extent of the building, but eventually north and south aisles will be added to the structure, together with a south transept, a north aisle for the organ, a western narthex and gallery, and north and south porches to the aisles. The style is that of an early period of the 13th century, and very much like in character the earlier churches of the north of France. The interior is of white and purple bricks; the floor being paved with Minton's tiles arranged in pleasing patterns. The architect is Mr. S. S. Teulon, and Mr. Burford is the clerk of the works. The exterior has at present an unfinished and rough appearance, the nave being bricked up on the north and south sides. The amount already expended upon the edifice is £7,846 17s. 5d.

LIVERPOOL.—The new Greek church, erected according to designs prepared by Mr. Sumners, architect, is now rapidly approaching completion, and will shortly be consecrated by the Archbishop of Syra and Tenos, who has expressly visited this country for the purpose. It is thought that the opening will take place on Sunday, the 16th inst., but the date is not yet fixed.

SALISBURY CATHEDRAL.—Some half dozen more figures have been placed in the vacant niches of the west front of the Cathedral during the past few days. The principal of them is that of the Virgin Mary with the child Jesus, an angel being on either side. These are placed immediately over the great doors of the western entrance to the Cathedral.

FISH-STREET CONGREGATIONAL CHURCH, HULL.—This building has been recently re-opened, after undergoing very extensive renovation. The interior woodwork has been entirely removed, and new seating, staircases, windows, &c., have been substituted for the old pews and fittings. The building has been refronted in brickwork and cement. All the woodwork of the seating is stained and varnished, the pulpit, table, and communion rail are in oak. The new vestibule is paved with Maw's plain tiles to a pattern. The building is lighted by two powerful sunlights. The whole of the works have been executed under the direction of Mr. Samuel Musgrave, A.R.I.B.A., of County-buildings, Hull.

MANCHESTER.—On the 18th ult. the late Bishop of Manchester consecrated the new Church of S. Stephen, City-road, Manchester. The ground plan of the church is oblong in shape, rather wider at the eastern than at the western end, by reason of the shape of the site. The north-east, or what would be the north-east if the building was oriented correctly, is the principal external view. The church is seated to accommodate 700 persons, and has cost about £5,000. Messrs. Ellis and Hinchcliffe were the contractors; Messrs. Thomson and Co., of Birmingham, supplied the gas fittings; the glazing is by Messrs. Edmundson; the heating apparatus by Haden; the east window is filled with stained glass by Heaton, Butler, and Bayne; and a sculptured medallion below the west window is by Mr. Green. Messrs. Medland and Henry Taylor, of Manchester, were the architects.

ROME.—During the week of the inauguration of the General Council at Rome, the chapel of S. Sebastian, in S. Andrea Della Valle, which has lately been under restoration at the cost of the Pope, was re-opened. His Holiness devoted some of the marbles of the Marmorata to this use; two of the columns of *paonazzetto*, which adorn the walls, were found in the same vicinity as long ago as 1843.

BUILDINGS.

NEWCASTLE-ON-TYNE.—Designs for orphanage and schools in connection with the Rev. Dr. Rutherford's church, have been prepared by Mr. Thomas Oliver, architect, at an estimated cost of £3,500 for the schools, or £4,500 if united with the orphanage.

NEW DRILL HALL AND GYMNASIUM, NEWCASTLE-ON-TYNE.—This building (to which we have before referred) is of brick, and of an unpretending architectural character, and is about 130 feet long. At the east end is a house, where the drill sergeant will reside; and the house also contains board, orderly, dressing, smoking, and secretary's rooms. The drill hall and gymnasium, which is about 105 feet long by 50 wide, is open from the ground to the roof, and is divided into five bays by cast iron pillars, which support the roof, and also the timber work of the gymnasium. All the necessary apparatus for a gymnasium will be erected in the hall. At the west end of the hall is a gunnery, in which will be kept the large guns; and over the gunnery is a gallery for the accomodation of spectators on the occasion of any entertainment, &c. On the north side of the building is a large armoury and store room, and also the usual out offices. There is an open drill yard, 70 feet long by 25 feet wide, at the west end of the building. At some future time a tennis court will be formed in this yard. The cost of the building and the fittings up of the interior will be about £2,000; and, besides this, there is the cost of the land, the whole being defrayed by Lieut.-Col. Potter. The plans of the building—which is most admirably adapted for the purpose for which it is intended—have been prepared by Mr. Thomas Oliver. The contract was let to Mr. Kennedy, of Jarrow, and the work has been superintended by Mr. Henry Andrews, the clerk of the works.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

P. O. O's. to be made payable to J. Passmore Edwards, at the Strand Office. All cheques to be crossed on the Union Bank.

RECEIVED.—A. F.—H. and A. P. Fry—C. N.—H. W.—D. H. and J. N.—A. G. H.—S. S. and Co.—J. H.—R. S. and Co.—R. S. and Son—A. L. and Co.—G. M.—W. C.—J. C. F. K.—C. S.—T. M.—T. B. B.—J. H.—W. O. C.—A. H.—G. F.—J. E.—R. J. R.—M. H.—E. W. M.—W. H. S. and Co.—M. and Co.—H. A.—J. C.—J. L.—C. B. A.

GEORGE REMINGTON, JUN.—With sketch of gateway, S. Albans.

F. W.—The address of Mr. J. K. Colling is 150, Hampstead-road, N.W.

J. A. P.—We do not supply transfer paper.

SOLOMON GREEN.—Could not say precisely without seeing the sketches.

THOMAS GREENSTED.—With sketch of west doorway of Rochester Cathedral.

Correspondence.

THE HOLBORN VIADUCT PIERS.

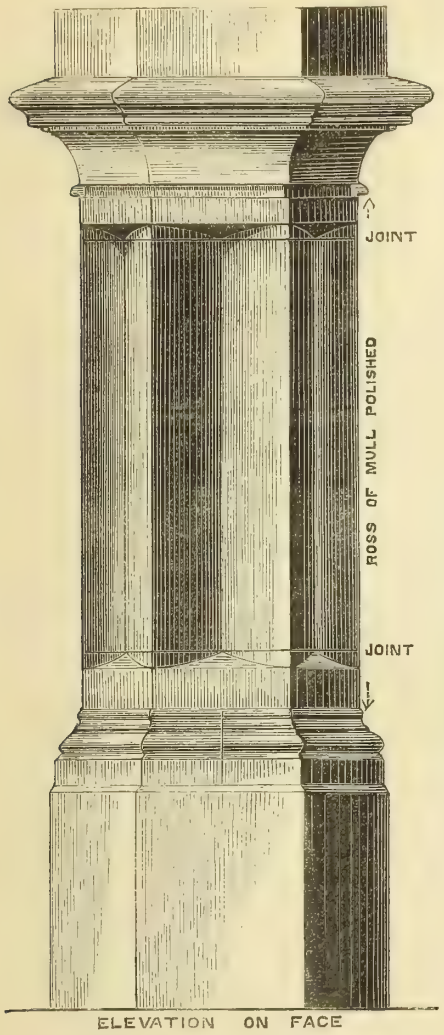
(To the Editor of THE BUILDING NEWS.)

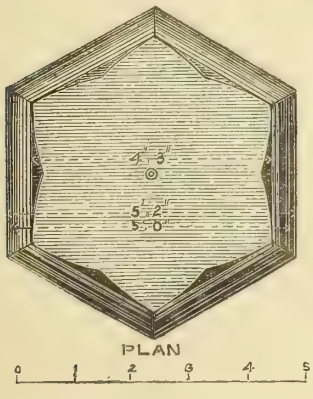
SIR,—The publication of the report of the engineers appointed to examine the piers of the Holborn Valley Viaduct-Bridge over Farringdon-street, affords to the proprietors of the Ross of Mull Granite Quarries, from which the red granite of the piers was quarried, the opportunity of explaining the cause of the giving way of these stones, and inquiring publicly, what departure from Mr. Haywood's original designs is referred to in the report of Messrs. Clarke, Bidder, and Harrison.

I send you copy of tracing of the piers furnished to me by Mr. Haywood's orders nearly three years ago. This tracing was furnished in order that I might give an estimate of the probable cost of these piers. You will observe in this tracing, joints are shown at twelve inches from the bottom of the Ross of Mull granite, and at nine inches from the top of the same granite. As it has been proved that the fracture of these twelve-inch and nine-inch stones has been caused by hollow beds and the improper use by the contractors of detached bits of lead instead of a continuous sheet or ring of that metal; the matter that I wish now to elucidate is that these comparatively thin stones, upon which the whole weight of the superstructure would be imposed, formed part of the original design, and the reason for that being the case.

When the design was shown to me in February, 1867, and the time (about twelve months thereafter) within which the work was to be finished,

was named, I represented that it would be much easier to have the work done in the time were the piers circular in form instead of the form shown in the drawing—the reason for this being, that the time taken by the masons in preparing, and by





the machinemen in polishing would be considerably shortened by the adoption of the circular form. To this Mr. Haywood would not consent, therefore the thin, and, unless carefully laid, weak pieces of stone, were retained in the design.

I have frequently admired the patience with which the inhabitants of London submitted to the great inconvenience of the opening of this noble Viaduct being so long deferred, mainly that the piers of this bridge should be angular instead of circular, and the great simplicity with which Mr. Deputy Fry explained that the delay was from the difficulty in getting possession of the ground, ignoring the fact that the arches of the roadway both east and west of Farringdon-street were completed many months before the bridge, the land for which was to be had for the taking. Mr. Fry has been rewarded by the five hundred guineas' worth of plate, and the public by the sight of fractured piers.

The proprietors of the Ross of Mull Granite Quarries are too well aware of the excellent qualities of the stone to fear much loss from the exaggerated reports of the damage done to these piers. We knew that when the truth came to be known it would be found that the stone was not at fault.

The massive columns of the Blackfriars-bridge were taken from the same part of the quarries, and I have been informed by Mr. Carr, the engineer of that structure, that he ascertained by experiment with a polished piece of Ross of Mull granite three inches in diameter, *evenly bedded*, that the crushing point was nine tons per square inch, or one hundred times more than the weight borne by the fractured piers at Farringdon-street.
—I am, Sir, G. W. MUIR.
Scottish Western Granite Company,
Glasgow, Dec. 29, 1869.

P.S.—It is necessary I should explain that although the fractured stones were taken from the quarries at the Ross of Mull, the proprietors are not in any way responsible for the quarrying, dressing, polishing, or fixing of these stones, these operations having been undertaken by the contractors of the Viaduct.

THE *BUILDING NEWS* ILLUSTRATIONS.

SIR,—From time to time you are pleased to inform us that certain illustrations are "drawn on transfer paper," and I fancy that method is better adapted to show forth the touches and peculiarities of each draughtsman, than either the ordinary engraving or the "photo-litho" process. But to re-draw a subject on that paper, in such a style as to make it worthy of THE BUILDING NEWS, would occupy such length of time, that persons at all engaged would not take that trouble. Cannot someone, therefore, invent a good tracing paper, that would answer the same purpose, so that the tracing laid on the stone should make an exact and faithful impression of the drawing, which I believe the "photo-litho" process sometimes fail to do? A few instructions in the matter—where the materials are to be obtained, &c.—would no doubt throw more spirit into the thing, and draw more numerous contributions to your "Sketch Book Series."

I was pleased to observe a suggestion that the "Sketch Book" should be extended to two volumes, and that the number of illustrations of one person should be extended. But I doubt the propriety of including new buildings. Surely there are subjects of mediæval work in London worthy of record.—I am, &c., J. H.

P.S.—Would it not be a good idea if you were to select a good subject or two from every county, typical as near as possible of the architecture of each?

THE BUILDING NEWS SKETCH BOOK.

SIR,—Having been much interested and edified by the different sketches forming your "Sketch Book Series," as they have from time to time been published, and feeling (in common, no doubt, with the great majority of your subscribers) a strong desire to see that work carried to a successful issue, a few remarks with reference to the letter in your last impression, signed "Chas. A. Jaques," may I hope be considered not out of place?

Dealing, in the first place, with your correspondent's first suggestion, I should imagine there can be no objection against increasing the present limit in the number of contributions, but such an alteration in the existing rules can only be of service in the event of the present number of contributors being so small as to preclude the possibility of publishing sketches at proper intervals; and I think the alteration should only be made on those grounds, otherwise one of the best features in the "Sketch Book"—that of providing a constant variety of treatment—each artist having more or less a distinct style—is almost lost.

The adoption of your correspondent's second suggestion—to make sketches of new buildings admissible—would, I firmly believe, be the means of lessening, to a very great extent, the interest now displayed in the "Sketch Book;" and the reasons for such belief are obvious. In the first place, in one portion of your paper we already obtain, from time to time, illustrations of new buildings erected about the country. Then, again, I think the policy of admitting sketches of new buildings is very questionable, inasmuch as it is giving encouragement to young artists to throw away their spare time in sketching works of modern architects, instead of employing that time in becoming acquainted with the works of the grand artists of the middle ages, almost as a natural consequence catching thereby the spirit and feeling with which all their works abound—a result which can never be obtained by sketching from new buildings, even though a lifetime were wasted on it. The last paragraph of your correspondent's letter ought not, I think, to carry that weight to his suggestion which he evidently intended it should do; for surely London cannot be quite so destitute as he would have it imagined. But even granting that in ancient buildings the metropolis is exceedingly poor, I think I am right in supposing that more than one museum contains subjects well calculated to enrich the pages of THE BUILDING NEWS "Sketch Book." Coming to pecuniary considerations, I think residents in London certainly have the advantage of those in the country, and your correspondent must not forget that a thing worth possessing often costs money to acquire.—I am, &c.,
S. SLINGSBY.
Stallwood, Folkestone, Feast of the Epiphany, 1870.

SIR,—I quite agree with the suggestion of Charles A. Jaques, that THE BUILDING NEWS Sketch Book may be extended to two volumes. If so, I hope foreign subjects will be acceptable. It is well known that there are many beautiful subjects in the portfolios of some of our architects, taken during delightful holiday times. Besides, it would be an inducement in future to take sketches at such a time if, peradventure, some of them found their way into "our Sketch Book."
A CONTRIBUTOR.

MIDLAND COUNTIES IDIOT ASYLUM COMPETITION.

SIR,—From the fact that the conditions of this competition appear to have been very fairly drawn up, and that the committee have asked each competitor to name three architects of eminence, from whom they may select their professional adviser, it is to be hoped that the result of the competition will be more satisfactory than several which have been lately under notice. As it is impossible for the competitors to address the committee, may I ask them through your pages, when they have made their award, to exhibit the various plans which have been sent in? The only recompense which the majority of architects obtain for their trouble in competing, is the educational process they go through in studying the requirements of the building in hand, and they are surely *fairly justified* in asking the opportunity to inspect the several designs, in order that they may see how others have treated the subject as well as themselves.—I am Sir, yours, &c.,
Jan. 3, 1870. COMPETITOR.

Intercommunication.

QUESTIONS.

[1730.]—NATIONAL SCHOOL PLANS.—Can any of your readers inform me what the custom is with regard to charging a client for plans which are sealed by and lodged with Government, which is required before the grant is remitted. I ask this, as it involves an extra set of drawings besides those to be deposited in my office and those supplied to the builder, which last two, in ordinary cases, are alone supposed to be included in the usual charge of £5 per cent.—F.

[1731.]—DRY ROT.—What is the best mixture or wash to adopt on foundations of walls and the gravel under the joists for a house affected by dry rot? The old sleeper joists and flooring are all removed, and new joists and flooring to be put down. Before putting down the new floors I think the whole foundations ought to be cleaned out and washed over with some solution; and also, what is the best solution for coating the sleeper joists with?—W. LAWRIE.

[1732.]—HURST'S "ARCHITECTURAL SURVEYOR'S HANDBOOK."—Can any of your readers explain the following?—On page 74 it states that the weight of wrought iron × 1·048 = the weight of brass. On page 75 is given the weight of round and square wrought iron in lbs. to the foot run, none of which multiplied by the figures above equal the weights given in the table on page 83. The same applies to the weights per superficial foot on page 85, and also to the copper.—H. A. R.

[1733.]—CAVITY WALLING.—Is cavity walling correctly measured as solid for reducing to standard thickness either for "all materials" or "labour only" in London, vicinity, or elsewhere?—F.

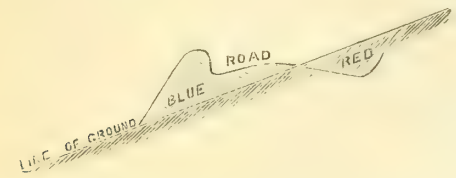
[1734.]—CONCRETE BUILDINGS.—Will any of your readers give their opinion of concrete buildings, which have been finished and occupied for some time (say at least 12 months). As to their comfort internally during both hot and cold or damp weather; also their external appearance after being built for a few years, the surface being left as the machine makes it; also, when plastered with cement? An uninterested opinion on these matters, and on concrete buildings generally, would greatly oblige many who have no means of judging for themselves, but who would gladly adopt the system if satisfied of its efficiency, among whom is,—DRY MATERIAL.

[1735.]—DUTIES OF ARCHITECT'S PUPIL.—Would any of your correspondents kindly inform me, 1. What are considered the duties of an architect's pupil? 2. Whether he is bound to give his undivided attention to his master's work, during office hours, which would leave him no time for reading, and making drawings, evening work being insufficient for such? 3. Whether he is bound to do things which in no way tend to advance him in his profession as an architect and surveyor, such as running on errands and doing the general work of an office boy? 4. Whether he is bound to attend office regularly like a paid clerk, which would leave him no time for outdoor study?—Q.

[1736.]—VALUE OF BUILDING WORK.—I beg to thank "F.R.I.B.A." for his valuable reply to my query as to the "Custom of the Profession." Possibly some other talented contributor will kindly give me his opinion on the "Value of Builders' Work? Taking value of "Constants of Labour," *vide* "Hurst's Handbook" as a basis, what rate per cent. should be added for each of the following items, viz., superintendence, plant, capital—the above independent of profit, which I put at from 5 to 15 per cent., according to the nature and quality of the work.—ÆDILES.

REPLIES.

[1712.]—PLAN DRAWING.—The term working drawings was considered applicable to all drawings to any scale furnished for workmen's guidance. The "Do.'s" apply to words on the same horizontal line. "All striped" and "medley" appertain to previous descriptions or "to words above." "Red for cutting and blue for filling" may be elucidated by the accompanying sketch, and applies more particularly to sections of earthwork. "Variegated" for concrete means a variety of colours dotted or commingled indiscriminately. "Striped," the colour previously described, applied thus instead of bodily; and "medley," the fashionable method of delineating glass in elevation are a conglomeration or "Joseph's coat" of multifarious tints. I am unacquainted with a suitable work on colour, and think Stanley, Carey, Archbutt, Elliott, Strawson, Lorenz, and others would be happy to supply any of the instruments quoted, each being suitable to the requirements and undoubtedly considered the best by their respective manufacturers. Lists post free upon application.—F.





[1723.]—FLOATING A CAISSON.—Referring to "Contractor's" sketch of caisson, the line C D represents its natural line of flotation, therefore the amount of ballast required to sink it to the line A B will be equal to the weight of water displaced by its increased immersion, which is obtainable as follows, the length being 25ft., breadth 32ft., and the distance between line of flotation C D and the line A B to which it is required to be sunk, 20ft.:—

$$\frac{32 \times 25 \times 20 \times 62{\cdot}5}{2240} = 446\tfrac{3}{7} \text{ tons, the weight of water}$$

displaced, which is equivalent to the weight of "kentledge" required to effect the rquired immersion. —WILLIAM MOOR, Jun., Hetton Colliery.

[1723.]—FLOATING A CAISSON.—To weight the caisson so as to sink 20ft., "Contractor" has only to find the weight of the body of water he would displace to give him the weight necessary to displace it. Thus $32 \times 25 \times 20 = 16{,}000$ cube feet, then $16{,}000 \times 62{\cdot}5$lb., the weight of 1 cubic foot $= 446\frac{1}{2}$ tons nearly.—JAMES FRANK SMITH, Leicester.

WATER SUPPLY AND SANITARY MATTERS.

THE REPORTED STOPPAGE OF THE METROPOLITAN MAIN DRAINAGE.—Several journals amused themselves last week by publishing exaggerated accounts of an accident at the Main Drainage works at Barking. An accident certainly occurred, but not of a character to cause any great concern or alarm. The particular part of the works temporarily affected is at Abbey Mills. Through excessive working, consequent upon the late heavy rains, a fracture has occurred in an air chamber, and a partial stoppage of the pumping was the result. As soon as the accident was discovered, immediate steps were taken to remedy it. No complaints appear to have been made respecting any difficulty having been found in the keeping clear of the City sewers, arising from the accident.

THE LAMBETH WATER SUPPLY.—The Registrar General directs attention (and with good reason, as we can attest) to the water now being supplied by the Lambeth Company, which is very turbid, and unfit for domestic use without filtration.

Our Office Table.

RAILWAY FROM CALAIS TO THE MEDITERRANEAN.—An examination has been opened in the department of the Cote d'Or on the project of a railway from Calais to the Mediterranean by way of Amiens and Dijon. On this subject a committee, which met at the latter town in November last, expressed the following opinion:—"Burgundy expects from the proposed line a new and important outlet for the direct exportation of its products to England, Holland, Belgium, and the departments in the north of the empire. This route will be for that district not only the cheapest but the most rapid; in this sense, that in addition to the smaller kilometrical distance, the merchandise will not be delayed a week by the difficulties encountered in passing through Paris."

LONDON ASSOCIATION OF FOREMEN ENGINEERS.—On Saturday evening, the 18th annual meeting of the members of this institution was held at the City Terminus Hotel, Cannon-street; Mr. J. Newton, of the Royal Mint, President of the Association, occupied the chair. A satisfactory balance sheet was presented. Mr. Newton was re-elected president of the association for the eleventh time. When first elected to the office in 1859, the association numbered only 59 members, and among its hon. members not one London employer was included. Now there are 108 good members on the books, and 60 honorary members. Of the latter, 26 are London employers. Mr. Newton stated that a great change had taken place in the feeling of employers towards the association. From having a strong objection to the organisation several of the masters had become its best friends.

PROPOSED WINTER GARDEN AND HORTICULTURAL SOCIETY FOR BLACKPOOL.—A meeting has been held at Blackpool in furtherance of the establishment of a winter garden for this increasingly-popular watering-place. The proposal is to be carried into effect by joint-stock enterprise.

A CASE FOR THE LAWYERS.—It is stated, but we know not with how much truth, that there will shortly come before the courts a case of great interest to architects and builders. About four years ago a company was formed in Birmingham for the purpose of building an exhibition hall, to be called the Curzon Hall. Mr. Edward Holmes, of Birmingham, was appointed architect; and subsequently the tender of Messrs. Horsley Brothers was accepted for the building. Four of the annual dog shows have been held in the hall, and it has also undergone some alteration, under the superintendence of another architect. Some defects of construction are now said to exist, and the company intend bringing an action against Mr. Holmes.

RAILWAY DAMAGES TO PROPERTY.—The case of Brand *v.* the Hammersmith and City Railway was where the owner of the house near which the railway was being constructed under the powers given by the Lands Clauses and Railways Clauses Consolidation Acts claimed compensation for obstruction of light, for damage to garden by limedust and smoke in the course of construction, and for "damage to which, the premises would be subjected, from the vibration, noise, and smoke from passing trains in the user of the railroad after construction." All these were allowed, by a jury, says a legal correspondent, to be proper grounds for compensation. But upon appeal to the Court of Queen's Bench, it was held that compensation was not properly claimable in respect of noise, vibration, and smoke. From this decision, however, the original plaintiff again appealed, and it was reversed by the Court of Exchequer Chamber; but upon a third appeal by the company to the House of Lords it was finally decided that the clauses of the Acts which relate to compensation extend only to damage caused during the actual construction of the railway, and not to such subsequent injuries as are caused by its fair and reasonable use, and that therefore the company were not bound to make any satisfaction to the plaintiffs for the injury resulting from the passing of trains.

THE DEPARTMENT OF SCIENCE AND ART.—A Manchester correspondent asks:—Will the Department of Science and Art explain upon what principle of public morality it justifies its recent action with regard to science teaching and science teachers? In September last that Department issued certain regulations determining the subjects to be taught, and the rate of payment to be made to Government science teachers for the current year ending with the science examinations in May next. In November, many weeks after the commencement of the various courses of lectures in the different branches of natural and physical science (mostly given in connection with Literary and Mechanics' Institutes), the Department, without consulting with the various teachers who had undertaken their engagements under its direction, and in faith of its guarantee, and several weeks after the body of teachers alluded to had entered on their respective duties, peremptorily repudiated its contract, substituting for it an entirely distinct set of terms. Supposing any commercial firm were thus to break its contract, in what estimation would it be held in the commercial world? Yet in what respect would the proceedings of the former be more honourable than those of the latter?

LAUNITZ, THE SCULPTOR.—The celebrated sculptor, Launitz, to whose chisel the people of Frankfort-on-the-Maine are indebted for the admirably-executed Guttenberg monument, has just died, after a tedious illness, at the age of seventy-four.

A CONTRACT IN NOTTINGHAM.—Mr. Tutin has written us another letter on this subject, in which he remakes his statements and confirms them by additional testimony. The insertion of his letter would, no doubt, call forth a rejoinder from Mr. Vickers, and as the matter cannot be discussed without, to some extent, becoming personal, we think it well to leave it where it is. We hope certain contractors in Nottingham will be more particular in future.

MORE PEABODY BUILDINGS.—The trustees of Mr. Peabody's Fund have purchased the site of the Old Magdalen Hospital, at the southern end of the Blackfriars-road, and it is proposed to erect blocks of dwellings thereon to be known as the "Peabody Memorial Dwellings." Possession will not be taken, however, until April next, and the old buildings of the Magdalen Hospital have been placed, by the Peabody trustees, free of charge, at the disposal of the guardians of the S. Saviour's Union, to be used in the interim as temporary workhouse premises.

THE PROPOSED BRIGHTON AQUARIUM.—At the first meeting of the shareholders of the Brighton Aquarium Company, held on Friday week at Westminster, the chairman stated that the engineer was engaged upon the detailed drawings, preparatory to the works being commenced. He also alluded to the company having secured the services of Mr. Lloyd, the well-known manager of the Hamburg Aquarium.

THE LANGHAM SKETCHING CLUB.—Mr. H. C. Pidgeon, the president of the Langham Sketching Club, has issued cards of invitation for the first *conversazione* of the season, which will take place to-morrow (Saturday) evening, when many of the pictures intended for the Suffolk-street Gallery and Spring Exhibition will, we understand, be shown at the society's rooms, Edward's-place, Langham-place.

ABANDONMENT OF A PROPOSED WEST END RAILWAY.—The number of private bills for the forthcoming session deposited in the House of of Lords is at present 241. The North-Western and Charing-cross Railway Bill was withdrawn at the last moment, though all the plans, &c., had been prepared and properly lodged.

THE PALACE OF WESTMINSTER.—Since the prorogation of Parliament great alterations, and in many respects improvements, have been made in the interior approaches to both Houses of Parliament, though the whole of the contemplated alterations have not been carried out, owing, it is understood, to the estimate having being exceeded. In the central hall the mosaic roofing is all but completed. In making the alterations in the roof the wet, however, came in continuously, and did much damage to the large gilt gas chandelier in the centre of the hall. This, however, can be repaired by the meeting of Parliament, though at a considerable cost. The statues of the Kings and Queens of England in this hall have been all taken down and thoroughly cleaned. Workmen were for some time engaged in gilding and colouring some of them, but after much progress had been made in such ornamentation the idea was abandoned, and all the statues have received a thick coat of plain white paint. Leading from this hall to the committee-rooms the centres of the solid moulded archways have been removed and glass substituted, in order to afford more light, and large sun-lights will also be placed here and in other places. The ornamental oak doors leading to the lobbies of both houses are now fixed, and afford considerably more light than formerly.

Chips.

The Palestine and the Sinai Exploration Funds have become one. The next (united) report will be issued from New Burlington-street, Mr. Bentley having been appointed the publisher.

The Lords of the Admiralty have decided on effecting a further reduction at the Chatham Dockyard by the abolition of the paint-mills and factory. It is expected that a considerable annual saving will thereby be effected.

The death has been announced of Mr. William Essex, enamel painter in ordinary to her Majesty and the late Prince Consort. He was 85 years of age.

A new Baptist Chapel is to be built in St. James's-grove, Peckham.

We note with much pleasure the announcement that Sir William Fairbairn is to fill the chair at the forthcoming anniversary Festival of the London Association of Foremen Engineers, which is appointed to take place at the City Terminus Hotel, on Saturday, the 19th of February. The yearly

THE BUILDING NEWS.

LONDON, FRIDAY, JANUARY 14, 1870.

S. LUKE'S CHURCH, NEW KENTISH TOWN.

IN our column of "Building Intelligence" for the 10th of December, we briefly noticed the consecration of this church in New Kentish-town, and we propose now to give a more detailed account of it, as being in some respects removed from the ordinary run of suburban churches, and also as being the maiden effort of a young architect, Mr. Basil Champneys, son of the Dean of Lichfield, and late vicar of the parish of S. Pancras, in which the church is situated. The opportunity which has fallen into the hands of this gentleman at so early a period of his career was a most fortunate one, and the sum at his command unusually ample, from the fortuitous circumstance that funds were provided by the Midland Railway Company, who had demolished the church of S. Luke's, King's-cross, in order to make their station at S. Pancras. This provision, supplemented by subscriptions raised, and necessary yet to be raised to defray the whole cost, will have amounted to £14,000, a sum far greater than any of the new churches in its neighbourhood have cost, and more than many of the stately Church establishments in the East-end of London, which we have recently reviewed. Under these circumstances the architect must forgive us if we regard his work somewhat more critically than if he had to battle against the want of means which generally cripples the efforts of his brother professional men. Upon the whole, however, we feel we can congratulate Mr. Champneys upon having produced a work of considerable promise, and one which is highly creditable when considered as his first work. It is bold and ambitious, and if it lacks somewhat of rhythm, and complete mastery of style, this is no more than must have been expected by those who entrusted to him so important a commission. Grace, indeed, it does not display throughout, but then the school which its architect evidently strives to follow is one which, as we once heard one of its members forcibly declare, holds as an article of faith that elegance is an emanation from a region hardly polite to mention. The display of vigour is its aim, and this sometimes is attained by efforts of a spasmodic character, the repression of which become needful if the sublime is to be kept clear of the ridiculous The style is said to be Early English, but our familiar friend, the Early French, has had a marked influence upon it, as well as upon most of the works of the school we have referred to. The material is red brick, pointed, externally and internally, with dressings of Tisbury stone, the colour and texture of which in connection with the brick are admirable. The church consists of a wide and lofty nave with lean-to-side aisles, a central tower over the first bay of the chancel, with the aisles continued eastward to embrace it, and projecting eastward thence is a polygon apsidal sacrarium. The tower and apse are vaulted with brick, with stone ribs, and the rest of the church has an open timber roof. The tower is to be completed with a saddle-backed high-pitched roof. The roofs are covered with Broseley tiles of rather too pale a tint. The arcade between the nave and aisles consists of four wide arches carried upon circular columns of a red conglomerate stone, which are effective. The arches are richly and boldly moulded, but the mouldings are somewhat clumsy, and not well in accord with those of the capitals. Some of the windows are nicely treated with roll-moulded brick jambs, &c., and the internal arches are carried upon delicate, slender shafts, in which we do not perceive much correspondence with the arcades aforementioned. The porches to both aisles are also of a more refined treatment, and with their groining and recessed order of arches carried on slender columns, are really successful features. The great west windows are well thrown up, and, though not happily treated inside, and of rather too bald a type of plate tracery, are unquestionably effective.

Close to the Church are the parsonage and another house by the same hand, of which we regret to say we can find very much less to say in praise than we can of the Church. They are, in our opinion, hopelessly ugly and uncouth in style, a sort of cross between the rigid type of utilitarian Gothic and the domestic work of Queen Anne's time. They are red brick piles, of which the general grouping is the best feature, with long narrow windows with wide white-painted frames, advanced as close to the outside as the Building Act would allow, with small panes of glass, divided by clumsy wooden bars. The plan and interior arrangements seem defective, particularly in the absence of any hall, and in the cramped nature of the passages and staircase. Nevertheless, they are not without evidence of much care and thought bestowed upon many of the details, and we are well aware that what strikes us as defects are considered merits by the school to which the architect appears to have given his adherence. The self-evident fact that such work does not meet the requirements of the age would in no degree change their opinions or practice, for their creed is that they must be right and the age wrong, and that no compromise should or ought to come from their side.

We ought not to conclude our notice of this group of buildings without calling attention to the unusual and remarkable excellence of the construction throughout, which is due to the honesty, zeal, and artistic knowledge of the builder who has carried out the works, Mr. Thomas Williams, the contractor for Llandaff Cathedral, and many other important ecclesiastical buildings.

The following additional particulars of S. Luke's Church have been supplied to us :—

The entire cost of the church, exclusive of architect's commission, has been £14,000. The walls are built externally with red Suffolk brick, and lined internally with the same material. The whole of the dressings are in Tisbury stone; the columns of the arcade of red Radyr stone, from near Cardiff; the small columns to doorways, windows, vaulting shafts, roof corbels, &c., are of green sandstone from Bridgend in Glamorganshire. The roofs are covered with Broseley tiles, from the manufactory of Messrs. Thorne. The floor of the chancel is laid with Messrs. Maw's tesselated pavement, and that of the nave and aisles with tiles supplied by the Poole Pottery Company. All the seats in the nave are executed in pitch pine. The base of the pulpit is of Radyr and Bridgend stone, and the upper part of mahogany and oak, the combination of which produces a pleasing effect. The octagonal font, executed in marbles of different colours, and having the alternate panels inlaid with intersecting circles, the emblems of the Trinity, the Cross, and the monogram of Our Saviour's name, was executed by Messrs. Burke and Co., of Regent-street. The stalls, which are handsome and richly moulded, are executed in teak wood. The brass lectern, the gift of Mr. William Gibson, of Kentish-town, is elaborately chased, and has the symbols of the four Evangelists wrought in it. The centre window of the apse is filled with painted glass, by Messrs. Heaton and Butler, and the effect of it is considered satisfactory.

MIDDLE CLASS LONDON DWELLINGS.

(Concluding article.)

OUR former article* on this subject contained some general remarks in advocacy of a more substantial and comfortable style of town dwelling; some also in condemnation of the existing style of dwelling—unhappily too well verified by the fearful burning to death, only the following week, of six persons in a dwelling-house in Sandwich-street, Burton-crescent. The daily press has little to say on the subject, even that little being restricted to comments upon people's excessive solicitude for the safety of their furniture and Christmas pudding, or their tardiness in bringing up the fire-engines; as if the safety of a London dwelling-house, once fairly a light, depended solely upon the speedy arrival of fire-engines and fire-escapes. Why, there are at this moment thousands of dwelling-houses in town that would at once succumb to the flames in case of the occurrence within them of that ordinary, trifling incident that caused this shocking catastrophe in Sandwich-street! The papers tell us of the upper part of the house and its staircase being ablaze in a moment, which could not have been the case had the stairs and the burning back room been enclosed with brick walls or partitions of incombustible materials, as they necessarily are in a block of "model" dwellings. In these buildings there is no inducement for the capitalist to construct wooden partitions in lieu of brick ones. Each floor is in plan a counterpart of the supporting story beneath it—a series of brick-enclosed cells or rooms. The stairs, similarly enclosed, can therefore be constructed of stone, or of (what is far better) tile and Portland cement. Moreover, as each staircase serves for several entire dwellings or flats, it occurs but seldom, or at wide intervals, in a large block; and the builders can well afford to make it not only fireproof, but spacious, substantial, and handsome. The floors in these model houses are usually vaulted, or made otherwise incombustible, but, for their practical safety from fire—that is to say, combustion of the fabric, involving loss of life—this costly mode of building is by no means indispensable. They might be safely floored with wood in the ordinary way, perhaps more safely than with iron joists and girders. The roofs, too, might safely be constructed with timber, and not one in ten thousand be burned off in twenty years. They might, indeed, ignite, and so might the timber floors, but, all having their bearings on incombustible walls, they could not "burst ablaze in a moment," like this wretched dwelling in Sandwich-street, or that equally wretched "mansion" burnt out not long ago at Notting-hill. The conflagration (or, let us say, simple flare-up) would be promptly enough extinguished by the fire-engines, safely and effectually "playing up" from the stone or tile staircases.

Now, an ordinary town house of the period is but from 15ft. to 20ft. wide, and, practically speaking, it cannot be built with fireproof walls and staircases. There are in it hardly any two floors alike, so that lath and plaster partitions, strutted up Heaven knows how, and hung up goodness knows whence, are a sheer necessity. The entire building, roof and all, is, from ground-floor to attics, propped up by or held in suspension from timber supports, and ready, if it catch fire anywhere, to collapse or snap asunder at any point and tumble into the cellar. There is plenty of constructive ingenuity, but no soundness in it; and thus it is that, in case of fire, especially at midnight, it is scarcely possible for the inmates to escape being burned to death. People often say, "What are the District Surveyors about to allow such an unsafe mode of construction?" But the District Surveyors have nothing whatever to do with it, and no control over it. The Metropolitan Building Act, while its clauses as to timbers inserted into party walls really induce this evil mode of construction, is silens as to a Londoner's right to burn his own house down. What it says impliedly is :—He shall not burn down or even endanger his neighbours'. And it well realises its object, for we rarely or ever hear of a fire in a town dwelling causing the burning down of an adjoining one.

* See BUILDING NEWS, page 466.

Party walls not only extend beyond the ceilings, but pierce the roofs, and are corbelled out, no matter how hideously, beyond the eaves. These contrivances, repeated, as they are, at every 18ft. or 22ft. down the front of a London street, are by no means "architecturesque," and are happily unknown in provincial towns. In a row of model dwellings they are to a great extent got rid of. Here we may say that their general introduction in London would perhaps do more than anything else to improve its dreary street façades. No one can deny that the fronts of the model middle-class houses in Victoria-street, Westminster, even in their dingy compo, have a certain air of grandeur or vastness of which the most costly façades of ordinary town dwellings are destitute. The very infrequency of the entrance doorways suggests a massive architectural treatment of those features unknown to the ordinary London dwelling-house builder. The very naming of that functionary (with his doorways, or holes in the wall—holes square, and holes semicircular—with imposts high above the springing of the arch) is distressing to think of.

On the score of mere economy these model houses would have much to recommend them to both the capitalist and the occupant. Their general use over the central districts of the metropolis would relieve the former of that wasteful application of valuable frontage involved in the now thick-setting of heavy party walls and mean staircases. These now occur at (on an average) every 20ft. of a middle-class dwelling, and if we contrast this arrangement all down a street of these houses with that of the Victoria-street flats, it will be seen what a great saving of ground-rent they effect, to say nothing of capital invested in the now frequent construction of such costly features as party walls and staircases, whose height, and consequent bulk, is ever on the increase to keep pace with the ever-increasing population of London. In this respect the waste of space in central parts of the metropolis is often absolutely absurd. The Rainbow Tavern, in Fleet-street, and the Red Lion Tavern, in Fenchurch-street, are signal instances of it, though by no means exceptional. Again, it now often occurs that, in even central parts of London—especially in cases of household property—the upper floors are comparatively worthless. People will not run up and down four or five flights of (or rather "pairs" of) stairs, in order to obtain the use of two—hardly ever three—rooms; and, in consequence, these uppermost rooms are often not merely lowly rented, but unoccupied. This would never be the case with the model dwelling. The stairs, once ascended, would give access, not to two rooms, but to an entire house of several rooms *en suite*. The uppermost flats in Victoria-street, Westminster, are never without tenants, and they are, moreover, highly popular. Lastly, the extreme simplicity of construction of these model houses is an unquestionable source of economy to the capitalist.

To the middle-class tenant they are a saving in many respects. A lady, who requires three servants to do the work of a five-storeyed house, will easily "work" a one-storeyed house with two, or even one, of these "greatest plagues of life;" and, what is of even greater consequence, she can herself, without effort, personally look into all that is going on in her household. A correspondent of this journal urges, or rather alludes to, the usually-uttered and apparently obvious objection to the number of steps to be gone up and down. It is one that on first thought seems unanswerable, but in reality these model houses effect a wonderful saving in this very particular. Many ladies, with their children and domestics, hardly go out of their houses oftener than once a day—sometimes not at all. In the latter case it is obvious there would, on even the very highest flats, be absolutely no stairs whatever to traverse. It is simply a question of quitting or remaining in the house during each day. Now, let us suppose, as an extreme case, that the Paterfamilias of the very topmost flat comes home every mid-day to lunch and returns in the afternoon to his office, comes home again, dines, and goes out every evening. In even this extreme case, in that of a topmost storey, the number of stair-steps he will go up and down will fall far short of one-sixth of the number of steps a lady or her servants now ordinarily ascends and descends in even a three-storey house of the usual construction. Here is, then, we say, a manifest economy to the tenant in this very item of going up and down stairs. While on the subject of economy, let us glance at the question of lodgers, a matter not to be ignored, when considering a plan for middle-class London dwellings. It has been asserted, and very likely with truth, that three-fourths of the population of London either sublet part of their houses to lodgers, or are lodgers themselves. This being so, it must plainly not be assumed that every middle-class householder will consent to solely occupy a flat of from six to nine rooms. There seems no valid reason why he might not, as now, sublet part of his house or flat. There would certainly be in a model house greater privacy for a lodger than in an ordinary dwelling. It is a mere question of fees for the porter or *concierge*, who attends and takes in letters, parcels, messages, &c., at the street door.

There is another prejudice against dwellings of this class, which they share in common with the political scheme of voting by ballot—it is that they are held to be "un-English." "Oh," we have heard a Londoner say, "that kind of house would never suit me, with my English John Bull notions; I call them Bastiles, sir—regular Bastiles!" Our friend had just been expatiating, and justly, on the discomforts of his town dwelling, and at the moment we ourselves, with a very laudable British hatred of "Bastiles," were struck dumb with the objection. It *was* at the time unanswerable, but now we imagine—*know*, indeed—that the occupants of these dwellings already built in town, both the gentle ones in Pimlico, and the simple ones in S. Giles's and Bethnal-green, tell quite another tale. Let any one who is oppressed with this peculiar Anglicanism go down to Victoria-street, and seek for it among the occupants of those large houses built by Mr. Mackenzie. They are, by-the-bye, too large and too high for the street, or the street is too narrow for them; but this is an evil that will be averted in future by the Metropolitan Board of Works, or the worshipful ædiles who are possibly to be set up in its place.

In central town districts of London, there can be no question about it, these "Bastiles," (wherever rents sink below £75 a year) are the only proper safe, sound, sightly, and economical dwellings to build. They cannot well be built by single capitalists of small means; they ought to be taken in hand by our Cubitts and Kelks, our Freakes, Lawrences and Mansfields, not *pro bono publico*, or for anything so heavenly or ethereal, but as an unquestionably good speculation. Such middle-class houses would yield a better interest than the in every case overdone model dwellings for the labouring poor, with their expensive paraphernalia of well-meant, but ill appreciated and ill-used "sanitary appliances," densely-packed coppers, water closets, cooking ranges, cupboards, air-valves, &c., &c. The "wage-paid classes," in nine cases out of ten, care "for none of these things." They in many cases stop up the air-valves, and when fuel runs scarce, as it too often does in London, refuse, God help them! to discern the utility of cupboard doors. Such features, in a larger middle-class dwelling, would, while of slightly dearer quality, be sparsely spread over a block of dwellings, and, as it is needless to explain in a technical journal, these larger-roomed, many-roomed dwellings would be far cheaper to build.

The question is a really serious one. London is already too big for the paltry 20-foot fronted houses it consists of. We all see it growing with gigantic strides into the suburbs, bigger and bigger, and yet if any one will go into any of these suburbs he may see, just at this time of commercial stagnation, the un-slated, un-compoed, stagnant carcases of just such combustible dwellings as are periodically burnt down, in Guilford-street with two, in Dover-street with three, in Oxford-street with five, in Gilbert-street, Bloomsbury, with eight, and now in Sandwich-street, St. Pancras, with six, of their unfortunate occupants. The earlier volumes of this journal contain dreadful particulars of many of these, and of other equally shocking holocausts in these treacherous, but unquestionably "English" homes.

Failing our large London builders, why should not the Duke of This or the Marquis of That, or some other of our half dozen aristocratic owners of London—veritable lords of the manor—whose wealth has, by its enterprise, grown so plethoric, take up the task, just *pour passer le temps*, or by way of honest speculation? These noblemen have all of them in their estate-surveyors very competent architects at their elbows, and if the hint were taken, even one row of dwellings each would really immortalise all the half dozen lords; for what would our Continental visitors behold when they came to town? Six, yes, "six" rows of London dwelling-houses not only designed by, but built—yes, "built," under the direction of *architects*. Ghosts of Pericles and Mecænas, what an opportunity!

SOLOMON SET-SQUARE.

THE UTILISATION OF THE SOUTHAMPTON SEWAGE.

SOUTHAMPTON is, we understand, about to utilise its sewage, which has been running to ruinous waste upon the mudlands of its surrounding shores. We heartily congratulate the local board upon at last resolving to rid this flourishing port of a source of pestilential mischief, and in making the sewage what it really and rationally should become—a fertilising agent. There are various ways of doing this, but these can be resolved into two general methods—the manufacture of the sewage into manure, and the perhaps more natural treatment, the distribution of the sewage by means of irrigation on the land. Both plans have their advocates, and both, to a certain extent at least, prevent the pollution of our rivers and streams. Of course, so far, either method is a great step, if not a decided gain on the wasteful and miserably stupid drainage of the very elements of reproduction into our nearest watercourses. When we hear, therefore, of any town adopting either one or the other of these systems, it is a pleasing duty to record the fact as showing the progress of scientific intelligence among public authorities, and a desire to keep pace with other communities in great sanitary measures.

The plan which is now being considered in that town with a view to an arrangement for effecting the above object, is well-known to our readers as the "A. B. C." sewage process, which we have described on a former occasion.

In 1869 the process was brought before the notice of the Local Board, who subsequently appointed a deputation to visit Leamington, to inquire into, examine, and report upon the works there, which report has at length been made, and from it we gather the deputation appear to have been favourably impressed with the process in operation. Briefly, it consists in collecting the sewage in a cesspool or receptacle, there mixing it with a compound solution of animal charcoal, blood, clay, alum, magnesia, and other ingredients, by a rotary agitator. This admixture at once precipitates the solid matter, forming a thickish residuum, which on being allowed to settle in tanks, is pumped up, dried by hydro-extractors, and brought into a dry, marketable state, the superabundant water running off clear and almost tasteless. Fish, indeed, have been kept for months in the effluent water.

We extract the following analysis of the manure as sold to farmers at £3 10s. a ton.

Water	14·1
Organic Matter	22·4
Phosphate of Lime	9·6
Earthy and Alkaline Salts	11·2
Silicates	42·7
	100·0
Nitrogen Ammonia	4·2

The cost of manufacture does not exceed 30s. per ton.

At Leamington, we understand, these results have been realised ; and there is some reason for believing a still better success will attend the "Native Guano Company's" process at Southampton. This town has a population of nearly three times that of Leamington, and possesses greater facilities of position and transit. The surrounding lands of the neighbourhood afford ample field also for the guano ; and if we are to accept the Company's statements, the fertilising powers of the manure are great. Practical farmers speak highly of it in its distribution over corn land and root crops, while for horticultural purposes generally, according to the opinions of some practical gardeners, it is more permanent in its effects than foreign guano—the ammonia being more fixed. In dry weather also, it does not burn the plants, as Peruvian guano. We hear the company offer the town £500 a year for the sewage. This, of course, is conditional, the town going to no outlay, but letting premises to the Company for the working of their process during a term to be arranged, terminable by a twelve months' notice on either side.

The sewage difficulty has been a serious one, and Southampton has perhaps suffered more from it than other towns, financially, at any rate. Having noble water-frontages on the south-east, and west it certainly behoves the Southamptonians to render their waters as pure and innocuous as possible, more especially to prevent the accumulation of mud along the shores, or anything that can render it inodorous, as upon this will much depend the claims of this port to rank as a watering-place of some pretensions. G. H. G.

THE LATE MR. JAMES WYLSON.

THE decease of Mr. James Wylson, architect, which took place on the 6th inst., at his residence in Islington, will occasion among a large circle of personal friends, and others, a feeling of deep regret at the loss of one who was alike distinguished for the variety of his acquirements and general knowledge, as well as for his estimable social qualities in private life. In the former capacity, his leaning was decidedly to the *practical* and *useful* in science and art, his delight being in the study of mathematical or mechanical problems, no matter how abstruse, which his naturally ingenious turn of thought led him to consider could be devoted to good account; while, in the latter capacity, those who knew him best could best appreciate that frank geniality of disposition, and that ready flow of lively and instructive conversation which issued spontaneously, as it were, from the resources of his well stored mind. When, on such occasions, a new idea happened to be propounded, or some question appeared to be capable of further elucidation, he was invariably loth to let the matter drop until it had been sifted to the utmost ; and he would frequently consult for the purpose one volume after another from the range of shelves at hand, till he was satisfied ; nor was it an uncommon thing to find that many of the volumes had been already enriched by careful references or marginal notes in his own handwriting. From this remark it may be inferred that Mr. Wylson was emphatically a man of persevering research, and of method ; such were, in truth, prominent traits in his character. His industry was most remarkable, nor less so his constant habit of "system" in even the minutest concerns. He had "a place for everything, and everything in its place." Indeed, but for this, it would have been impossible for him to have accomplished one-half of what he did in an incredibly short space of time ; and this without in the least degree passing over things superficially. Mr. Wylson was at all times, and on many subjects, a ready and accurate writer. Besides his frequent contributions to the current literature of the day, which were always more than merely acceptable, his versatility was displayed in his aptitude for writing poetry, especially of a humorous kind ; this being coupled with a refined taste for music, in which he occasionally essayed his powers of composition ; and his friends possess, in either the single or combined form, many clever effusions which had been struck off in the whim of the moment. This use of the pen in different ways would appear to have been resorted to by him as a real source of recreation, until the pressure of other duties imposed on it a comparative restriction, for, besides what appeared from time to time in print, the amount of "manuscript" he has left behind him would fill volumes, irrespective of certain important works which he was preparing for distinct publication. He was one of the earliest contributors to the *Builder*, and an article by him which appeared in the volume for 1844, upon "Cements," attracted, among others, considerable notice. He afterwards edited the "Engineer's Pocket-book," a very useful little publication ; and in 1859 he published his "Mechanical Inventor's Guide," a work which contains a mass of condensed information, designed to form a practical introduction to the principles and components of machinery, being further illustrated by copious diagrams, and a collection of nearly three hundred mechanical movements.

A few additional particulars respecting Mr. Wylson's general career will not be uninteresting. He was born in Glasgow in 1811, and served an articleship of five years in that city to an architect of the name of Weir, with whom he remained for four years afterwards. In 1836 he removed to Norwich, and was for a short sime with Mr. John Brown, a well-known architect there. Upon reaching London he became the senior clerk in the office of Mr. Sydney Smirke, where he remained till the year 1843. About this period the writer of the present notice became acquainted with Mr. Wylson ; being, in 1842, one of a few "Architectural Draughtsmen" who formed themselves into an "Association," with that gentleman at their head, Mr. Wylson being both the originator of the Society, and its first secretary, When circumstances led him to relinquish the latter office, he was presented by the Association, as a kind of testimonial, with a handsome pair of massive silver compasses, expressly designed for the purpose. The meetings of this association were first held in Castle-street, Holborn; they next met in Southampton-street, Strand, then at Lyon's Inn Hall, (also in the Strand, and since pulled down); and now, in a more developed form, they constitute the "Architectural Association," meeting in Conduit-street, Regent-street.

Mr. Wylson first established himself in practice in his native city, where he designed and carried out many important public and private works ; among which may be mentioned,—an extensive range of "model dwellings for the labouring classes ;" the Prince's Theatre, since taken down, the site being otherwise required ; and S. Luke's Free Church. To the pulpit in the latter building he applied with success, in 1855, the theory of the parabolic form as a sound reflector. He also assisted in establishing the Glasgow Athenæum, and for his professional services rendered to that Institution, the Board presented him with a ticket of life-membership, besides electing him a director. In 1848 he received, out of 100 designs, the first premium for a plan for laying out the lands of Gilmore Hill for building purposes. Upon his quitting Glasgow, in 1850, to return to London, he was honoured with a public dinner by invitation from the resident architects ; and we next find him occupying a responsible post in the office of the late Sir C. Barry. His future course became somewhat changed when he received the appointment (out of 55 candidates) of Surveyor to the "National Freehold Land Society," which he retained until his "department" was annulled by the trade in land being so seriously affected by the Crimean war. He was subsequently chosen (about ten years ago) Surveyor to the "Conservative Land Society," which office he continued to hold until his death, as also a similar office in the "United Land Company, Limited," which has been only comparatively recently established.

In the discharge of his multifarious duties, as in everything that he undertook, Mr. Wylson was truly indefatigable ; a man of the strictest integrity, and so utterly unselfish that there is reason to think that this very conscientiousness has tended to hasten his removal ; inasmuch as, although subject of late years to severe attacks of a distressing complaint, it was with great difficulty that he could be persuaded, under any circumstances, even partially to relax his efforts ; and he may be said to have died literally in harness. His remains are to be interred to-day in the Brompton Cemetery. J. D. W.

THE ARCHITECTURAL EXHIBITION SOCIETY.

CERTAINLY this society has a wonderful amount of vitality, or it would have ceased to exist long since. Year after year it puts forth most commendable efforts, and year after year it meets with discouragement. Though the profession is solicited and coaxed, though the art public are invited to come in, though the hanging committee do their best to do justice and give satisfaction, still the Exhibition is not appreciated. One goes a few days after it is opened, and he sees only a few visitors, and they appear languid and indifferent, and he cannot help contrasting it with another Exhibition—the Academy—which is open at the same time. In fact, this striking contrast tells unfavourably against the Architectural Exhibition. In one place all is life and fervour—in the other vacancy and stillness. We say this more in sorrow than in anger. We say it not to discourage the Council, but to state a fact. Once more the Council have made, as they have done for years past, an appeal to the art public. This time we earnestly hope their efforts will work a heartier response, bring more exhibitors and visitors, and yield a richer revenue.

The following is an extract from the circular just issued by the Society, and bearing the names of the Hon. Secs., Robert W. Edis and Rowland Plumbe :—

"The Council consider that the period has now arrived, taking into consideration the increased art education of the public, and the necessity for insisting upon the proper recognition of architecture as a fine art, when a strenuous effort should be made to place the Exhibition on a more substantial basis; this can only be done by obtaining the general assistance of the profession to secure a first-rate Exhibition of works in their branch of art, in order that the public may find it as much as possible attractive and interesting, and be able to form a fair judgment of the progress of architecture in this country.

"It was anticipated last year, when the Academy took possession of their new premises, that they would have been able to set apart at least one of their galleries for architectural drawings exclusively, and, with increased accommodation, to provide for a suitable representation of the architectural profession. Such, however, was not the case. Amongst the works exhibited were only fifty architectural drawings, representing the works of about thirty architects. This naturaly caused much disappointment to those of the profession who hoped to find space allotted to them in the new rooms ; and it can hardly be anticipated that the Academy will, at any time, be able to do more than hang a very few architectural works, the demand upon their space for purely pictoria works being continually on the increase. Architects must themselves maintain their own Exhibition, if they wish the position of their art and its annual progress to be fairly represented.

"It is hoped, therefore, that the profession generally will carefully consider whether they desire that their drawings shall be collected together annually for exhibition, or, in a great measure, be omitted from the annual gatherings of art works in London. Unless, however, architects are willing to aid and support this Society, the Council will reluctantly have, after the next year, to discontinue the Exhibition, as they cannot otherwise possibly hope to make it either worthy of the profession it desires to represent, or of the attention of the general public."

THE CITY STREETS.—In THE BUILDING NEWS for August 6 last, we referred to the worn and dilapidated condition of the roadways of some of the City streets, instancing, as an example, Fleet-street. We are glad to see that at the last meeting of the City Commissioners of Sewers, Mr. Solomons directed attention to the slippery condition of the roadway in Houndsditch. The stones laid down are so small and smooth that there is no foothold for the horses. Mr. Nind also complained that the roadway in Barbican was in a similar state. These complaints were referred to the Streets Committee for consideration and report.

A new iron church has just been erected at Cardiff by Messrs. Francis Martin, and Co., of Liverpool. The church holds 160 people, and cost £400.

Building Materials and Appliances.

STEAM POWER AND BUILDING OPERATIONS.

THE profession of the engineer and that of the architect have so much in common in their several duties as well as in their difficulties, that it may well cause surprise when any instance is found of the practitioner of the one neglecting to avail himself of such labour-saving contrivances devised by the other as would in any measure tend to facilitate his work. Examples of such neglect, however, are more likely to be found in the practice of the architect than in that of his colleague, and perhaps the reason for this is, that the field in which the engineer pursues his vocation is more extended, and contains greater demands for labour-saving appliances than that of architecture.

One example can be cited in which the architect has apparently failed to a great extent to avail himself of the numerous mechanical contrivances devised by the engineer for raising weights; as in none save works of great magnitude do we see the services of the steam crane invoked, in all others the "material" being transferred from the ground to the scaffold by what may well be designated that clumsy contrivance, the hod, a contrivance alike wasteful and unscientific in the application of power, and at once unworthy of the technical knowledge and the commercial experience supposed to be possessed by the practitioners of a liberal profession. A little analysis will show how rude and unfitted to an age eminently scientific, is the practice of conveying bricks and mortar from the ground, to, say, an altitude of twenty-five feet, in a box supported on a man's shoulder. It may be said that the practice is so universal as to justify its advocates in quoting the proverb, "Vox populi, vox Dei." But how long was the custom of lighting the street lamps by means of a man ascending a ladder for the purpose—how long was that custom sustained by the voice of the people? Yet now, when abandoned, all sensible people wonder it was ever in use.

To a thinking mind it must appear equally silly to employ a costly locomotive engine, such as a strong man certainly is, and which weighs perhaps one hundred and fifty pounds, a carriage, as we must regard the hod, weighing some forty pounds more, or a total of say two hundred pounds, to raise an actual paying load, to use railway parlance, of about fifty pounds, which is just one-fifth of the gross load raised; and in order to have our analysis complete, we must also recollect that the engine and carriage return empty; so that, in point of fact, the paying load taking the double journey of the engine, is, we may say, but about one-eighth of the whole. The duty, too, is one attended with considerable danger to life and limb, so that even from the sentimental point of view of common humanity the practice is an objectionable one.

Again, taking a commercial view of the matter, we find our analysis work out thus, Scientific men need not be told that five and a half men are generally considered theoretically equal to one indicated horse power in steam machinery. We will however, for practical purposes, assume that it is but in the proportion of four to one; therefore, an engine of 1-horse power would exert as much power as four men; it is unnecessary to give more detailed calculations.

This engine would consume in ten working hours, inclusive of raising steam in the morning, about 1cwt. of coals. Coals good enough for this purpose can be obtained in London for twenty shillings a ton, and in most country districts for much less, so that the engine would consume about fourteen shillings per week. Then the other expenses would be, say, one shilling per week for oil and tallow, the drivers' wages, say eighteen shillings per week, maintenance two shillings, and interest on original cost of engine and machinery, one shilling, cost of transport from place to place, say two shillings; then we must add to this the wages of what may be called a brick-trimmer on the scaffold, to attend to the unloading there, and also to arrange the bricks, &c., for the bricklayers—say his wages equal a hodman's, or twelve shillings per week; the engine-driver could very well load the buckets in which the bricks or mortar was placed and attend so small an engine as well. On the opposite side of the account we have four hodmen at twelve shillings each, so the totals would stand thus: steam-power would cost £2 2s., while manual labour would cost £2 8s. per week; we believe also that steam on a larger scale would show more conspicuous economy. Our French neighbours, who are distinguished for the scientific manner in which they handle these kind of things, rarely or ever use a hod. In all cases when a new building is planned out and the foundations laid they erect a sort of derrick with four tall masts or posts strongly tied and braced; at the summit of this, they secure a purchase-block. With this derrick all the materials are raised to the workmen above, in the case of small buildings the hoisting power being manual, while on larger works the steam-engine is employed. In the case of very extensive building operations, they place a portable floor-engine in the central apartment on the ground, by which they drive a lay shaft run along the scaffolding, at about the height of the first floor, one end of which shaft actuates the crane machinery of the main derick, which raises the more ponderous weights, while suitable provisions are fitted along the shaft itself by which smaller matters are at once raised to the level of the scaffold. There should be no difficulty in applying a source of power so portable and so cheap as the steam-engine to the hoisting of building materials. There are numerous instances too, where a water-engine or a small turbine might be made to actuate the crane, the power for either engine or turbine being taken from the water-main in the street; this could be done, we are inclined to think, in low level districts where a strong head of water could be commanded. We have abolished the practice of raising a lucifer-match to the top of a lamp-post by sending a full-grown man up a ladder for the purpose; it is time that we likewise abandoned the practice of sending our bricks and mortar up on a scaffolding in the same old-fashioned manner.

GRANITE TRAMWAYS.

IN his report to the Holborn Board of Works on the schemes now seeking Parliamentary sanction, for the improvement of the metropolis, Mr. Lewis H. Isaacs, the surveyor to that body, offers some suggestions which may be worthy the consideration of those concerned in the attempts now being made to introduce the tramway system into the streets of the metropolis. He advises the use of granite tramways instead of iron. He was first struck with the merits of the idea while visiting some of the cities of Northern Italy some years ago.

In the Commercial-road East, a granite tram has been laid down for many years, extending from the western end of the road to the West India Docks. This tram was designed for the convenience of the heavy traffic from the docks to the city; but as its construction permits the passage of all wheeled vehicles over its surface, its use is not restricted to the Dock Company's carts and waggons. No objection, Mr. Isaacs thinks, can be raised against it, unless it be its cost, and this disappears when the saving it affects in tractive power, and the wear and tear of vehicles, is remembered. In opposition, therefore, to the iron tramways for which Parliamentary sanction is now sought, he recommends united action on the part of the local authorities concerned, and the laying down a double line of granite tramway for the entire length of one of the leading thoroughfares of the metropolis—say from the Marble Arch to the General Post Office.

The tram stones should be of Guernsey granite, 18in. wide, 9in. deep, and 6ft. in length. The inner edges of the stone should be 4ft. 6in. apart, and this space should be paved with Guernsey, Aberdeen, or Mount Sorrel cubes 3in. wide, and of the same depth as the tram stones, 9in. There should be a clear space of 2ft. between the two lines of trams, and this, with the remaining width of the street, should also be paved with Guernsey, Aberdeen, or Mount Sorrel cubes, as before described. The whole should rest on a substratum of concrete, composed of hydraulic lime and clean Thames ballast, and of the uniform depth of 12in. all over. In setting out the trams, the centre of the street should be found, which should serve as the centre line of the 2ft. space; thus the trams would approach to or be removed from the footway, according as the width of the street increased or diminished. The whole width of the two lines of trams and the space between would be 17ft., which would leave ample margins on each side in streets of such width as Oxford-street and Holborn. In clearing cab ranks or safety crossings, placed in the middle of the road, the trams would be inclined towards the footways until the obstructions were passed.

"Great stress," says Mr. Isaacs, "will, no doubt, be laid before the Parliamentary Committee on the success of the iron tramways in New York, as also of that from Paris to Versailles. Of the American trams, I am unable to speak from personal knowledge; but in the Versailles route, it should be borne in mind, that, although the omnibuses start from the Place du Palais Royal, it is not until they reach the Champs Elysées, by the Pont de la Concorde, that the tram proper commences, when the ordinary wheels are removed from the omnibuses, and flanged wheels substituted in their stead. Applying this example to London, and making allowance for the difference in size of the two cities, it may be stated that whilst an iron tramway would be permitted westward of the Marble Arch, it would not be allowed to come nearer to the City than that point. The Parisian tramway omnibuses are large, roomy, comfortable vehicles, carrying 64 passengers, and are drawn by three horses. A London omnibus, drawn by two horses, now conveys 26 passengers, but I have no hesitation in saying that on a road possessing ordinary gradients and provided with granite trams, such as I have described, the same tractive power would be found sufficient for an omnibus conveying 46 passengers at the least. This load would not only be easily set in motion, but the motion would be economically maintained as far as the tractive power was concerned. The jolting now experienced in riding over a paved surface (especially where the roadway is out of repair) would be remedied, and there would be a sensible diminution of the noise caused by the traffic. Finally, the materials and the method of construction I have recommended would ensure the roadway proving of a lasting character, provided it was not interfered with by the gas and water companies after it had become consolidated."

PARQUET FLOORING.—Mr. George Needham Mansfield has patented a method of making inlaid flooring. He uses wood veneers for the wearing surface, and these he backs up with sheets or strips of kamptulicon, prepared either with or without an internal layer of canvas, or with the material ordinarily used for floor-cloths; or he uses india-rubber cloth, such as that manufactured for covering stairs, and which possesses the property of deadening sound. The veneer is attached to any of these backings by some adhesive material, and is so prepared as to resist the action of damp. An advantage secured by this invention is, that the covering may be laid down in strips or pieces of any form, and arranged in any pattern. It is attached to the floor by marine glue.

HACKNEY DOWNS.—This "lung" to the neighbourhood of Dalston and Hackney, is being, to some extent, curtailed of its value as a public recreation ground, by the construction of a branch of the Great Eastern Railway, which crosses the "Downs" by means of a cutting. At the last meeting of the Hackney Vestry, it was resolved "That in the opinion of this Vestry, as representing the rate-payers of Hackney, it is not desirable that the Great Eastern Railway Company should be permitted to retain their cutting across the Downs as an open cutting, either in whole or in part."

Furniture & Decoration.

MURAL OR MONUMENTAL DECORATION.*

WE gladly welcome Mr. Thomas as an efficient labourer in a more practical field than those in which his previous literary labours have been expended. "The Science of Moderation" and "Metronomy; or, the Science of Proportion," were, in our opinion, subjects too purely theoretical to yield much fruit for the craving of others than metaphysicians, and we own to be far better content now, sitting at the feet of the author to learn what his experience has well qualified him to teach—the secrets and comparative merits of fresco, encaustic, water-glass, mosaic, and oil painting, the subjects treated of in the volume under consideration.

Mr. Thomas, as he tells us in his preface, has studied fresco painting in Munich under the direction of Professors Cornelius and Hess, but his own decorative paintings upon a monumental scale are so well known to our readers, that no further credentials are needed to entitle all he has to say upon these interesting subjects to the best attention of those engaged in the endeavour to advance those arts. The reasons for their encouragement, tersely given in the introductory chapter, namely, "(1) as a memorial of national existence, and (2) as the record of the aspirations of that existence," are so cogent that they would hardly need a word of comment but that, judging from their works, our artists appear to give but slight heed to them, seeming rather to consider that the existence of any other country and age than their own is what they are called upon to memorialise, and that fictitious, rather than real, aspirations are what their works should record. Our poets dress up for us dolls of the mythical court of King Arthur, or fancied visions of Jason and other heroes of mythology, and our painters treat us like children to idealisations of our forefathers and the bric-a-brac of curiosity shops; while all the stirring events of our own age, which are capable of being matched against any of those of history, pass unrecorded except by newspaper correspondents, and the features of our distinguished men remain unlimned save by photographers or the inferior class of artists who unfortunately constitute the majority of our portrait painters. Great then, is our need of that monumental art which, in the words of Mr. Thomas, "in its highest development exercises a dominant influence over the arts of design of a country, binds them together, gives them a certain unity of action in conformity of motive which spasmodic art, originating in individual and disconnected culture, never can."

Further on we read, "The grandest style of art is best displayed in large dimensions * * As, therefore, works of art of such magnitude cannot be often in demand for ordinary dwelling houses, it is important that mural painting should be encouraged in churches and national municipal public buildings." But to what end, without unity of purpose and worthiness? On this point he remarks, "There may be a clever, but never a grand manifestation of art, till a people be moved by one pulse, one simultaneous throb; till all talent is concentric to a common purpose. . . . Do Englishmen ever ask themselves, whither bound—to what end—are art, literature, and politics tending? Has England a part to play in the world's History, and what? . . . It is unity of purpose alone, in art, literature and politics, which constitute greatness and which gradually raises a characteristic and enduring national monument."

Commending the above terse and pregnant remarks to the serious thought of those whom they concern, we proceed to the practical portion of the volume before us.

The chapter upon fresco painting is, we think, calculated to dispel many erroneous notions which prevail on the subject, and to convince that it is not so unsuitable to our climate as is often thought. What is needed most is experience on the part of our painters, and care in the preparation and materials of the surface to be painted. But the lack of what Mr. Thomas calls the comparative luxury of oil-painting tends doubtless to discourage its use; yet were schools of painters trained to mural decoration, sufficient demand for that class of work would ensure a sufficient supply; much of the more disagreeable and laborious work would be executed by subordinate hands, and need only the supervision of the principal; and though our author confesses that it is not an art for the hesitating and timid, and that the grand style of drawing, the broad and simple treatment of colour, an eye steadily fixed on the whole effect, and an energetic and rapid hand, are qualities rare in these days, this arises mainly from their not having hitherto been called for.

Minute particulars are given in the work as to the preparation of the surface. The walls should be of brick, thoroughly dry, a brick and a half thick, in preference to a greater thickness, unless the walls are built hollow. Old walls must have their plastering removed and fresh applied, and ceilings need a more durable basis than lathwork. Equality of roughness in the under coat, and care in the selection of the lime used, is strongly recommended, and a good suggestion is made that if the walls slightly inclined forward, dust could not easily settle upon the pictures. Durdham Down lime, from near Bristol, composed of carbonate of lime 99·5, bituminous matter 0·3, and earthy matter 0·2, is considered the best, and all need a long time to reduce their causticity, and directions are given for their slaking and mixture with sand. The colours used in the painting must chiefly be simple earths—no vegetable, and but few mineral preparations being admissible, and brilliant colours not having been found to stand.

The method of executing the painting is then described. The first coat or "rough cast" being dry, the cartoon tracing and sketch of colour ready, and the plasterer at hand with his fine mortar for the *intonaco*, the area intended to be painted is then lightly floated on in two coats, at an interval of about ten minutes. A roll of soft wet linen is then passed over the surface, and any loose particles of sand dusted off. The outlines being then traced upon it, and the colours sufficient for the day's use properly mixed, the painter proceeds to pass a thin wash of one colour over the *intonaco*, which is then left for about ten minutes.

The light and shade is then indicated with the shade tints, and shortly afterwards the middle tints are applied solidly, and the work modelled in. After an interval of about half an hour the last delicate finishing touches are added with the glazing tints, by which time the mortar will become too dry to continue working upon, although there are means of retarding this if desired. The superfluous mortar is then cut away with a knife, so that the next day's work may be done in a similar manner, the painting progressing "like the filling up of a child's puzzle map, piece by piece," the nice adjustment of which is of great importance.

Such is *buon fresco* painting; there are, however, other modes resembling it in effect, such as *fresco secco*, in which the usual fresco colours are used on a dry *intonaco*, the ground being merely resaturated with water previously to painting upon it; the result, however, is less brilliant.

Mr. Thomas acknowledges that as many modern Continental painters have failed in the use of fresco as those of our own country who have experimented at Westminster; still he maintains that longer experience by continuity of practice is all that is needed to make them willingly accept it as "the best method of executing works of art for important public buildings.

Having dwelt at length upon this portion of our author's treatise in consideration of its practical value, we shall defer to a future occasion our remarks upon the remaining processes discussed by him. J. P. S.

* Mural or Monumental Decoration—its Aims and Method. By W. CAVE THOMAS. London.

CHURCH DECORATION.

THE following remarks by Mr. Albert Hartshorne, in a late number of the *Harrow Gazette*, will be read with interest:—

Amongst the numerous innovations from which we have suffered of late years, none, Mr. Hartshorne thinks, makes itself more conspicious at the present season than church decoration. For several weeks before Christmas organised bands of young ladies set themselves to work to "decorate" the parish church, and in order to accomplish this end it appears to be necessary to manufacture an almost unlimited quantity of wreaths, garlands, festoons, chaplets, crosses, triangles, crowns, stars, and monograms, of every conceivable shape and colour. These various devices are then arranged, according to the taste and fancy of the fair artists, upon the walls and in the windows of the church. The arches and piers are covered with heavy festoons (the greatest care being usually taken to hide from view any architectural beauties which modern restorers may have spared), cardboard inscriptions of an approved indecipherable Gothic type spread themselves in gorgeous array over the chancel arch, or run along the steps of the altar; the pulpit, lectern, and font are bedecked with holly and other prickly evergreens, often to the signal discomfort of the officiating minister. But the grand effort is generally reserved for the east end, and here, in addition to the evergreens and inscriptions, are crowded all the flowers, real or artificial, and bunches of berries which can be obtained; even cotton wool is pressed into the service as being so much like snow, not to mention home-made paper flowers, pink calico letters, dyed everlastings, and other distressing anomalies. For several days before Christmas the inside of the church is like a workshop, while carpenters and labourers are busy nailing up the "decorations" with their usual reckless disregard for the architecture and carvings. The over-decking of churches did not escape the observation of the *Spectator*, who thus alludes to the subject in 1711, No. 282—"The church as it is now equipped looks more like a greenhouse than a place of worship. The middle aisle is a very pretty shady walk, and the pews look like so many arbours on each side of it. The pulpit itself has such clusters of ivy, holly, and rosemary about it, that a light fellow in our pew took occasion to say that 'The congregation heard the word out of a bush, like Moses.'" The somewhat similar spectacle which gladdens the eyes of the faithful on Christmas Day is well known, for is not every one eager to go to church to see the show? Do not its beauty and merits form an almost unexhaustable theme for conversation for weeks after? How charming Mrs. Smith's pink and white cross looks which floats in the font; or how very nicely the clever Miss Jones' have made the garlands which cover the pulpit! Our foolish forefathers, as a rule, went a different way to work, and in some benighted districts their system of "sticking the church" is still held in reverence; sprigs of holly and ivy were formerly thought sufficient to remind us of a glad season, and a few years ago one almost felt sorry when the word came—

> "Down with the rosemary, and so,
> Down with the bays and mistletoe;
> Down with the holly, ivy, all."

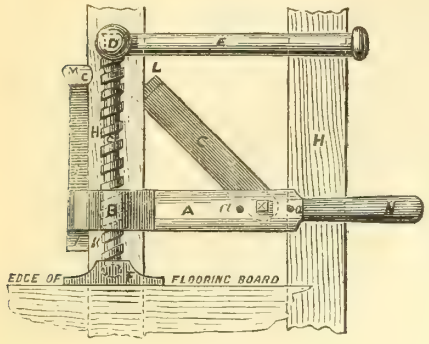
Now it is a positive relief when Candlemas Day comes and the faded finery is removed, and we once more see the church in its pristine state.

PAVING OF OLD STREETS IN BETHNAL GREEN.—At the last meeting of the Bethnal Green Vestry, the clerk reported that he had received the sanction of the Metropolitan Board of Works to the further loan of £10,000 for the paving of footings and old streets in the parish. The Vestry directed the clerk to take the necessary steps for raising the money. The paving of the wretched streets which abound in this neighbourhood cannot but have a beneficial effect on the sanitary condition of the inhabitants, for paved thoroughfares can always be kept clean.

PAIN'S FLOORING CRAMP.

A VERY handy flooring cramp—applicable moreover to other purposes—is here illustrated. Fig. 1 shows its general construction.

FIG. 1.



It is composed of a metal plate A having a boss B pierced with a slightly inclined screw-tapped hole, through which passes a screw C, the head of which is perforated at D to receive the end of a lever E, and the opposite end socketted in a foot plate F. The metal plate traversed by the screw also carries a gripping lever G bolted loosely on its under side, the plate being pierced with several holes *a a*, so that the pivoting of the gripper may be shifted at pleasure. The action is as follows:—The plate is laid flat on the joists H H1, so that the gripper G lies between the joists, the end coming against the joist, and the foot-plate F against the edge of the outer flooring board. The cramp being in this position the screw C is turned by the lever E, so that the foot plate begins to press against the edge of the flooring board, and the main plate A to recede from it; this backward motion of the plate A along the screw C causes the end of the gripper G to nip against the side of the joist H, forming a bearing which becomes firmer the more the screw C is turned in the same direction and the greater the pressure brought on the flooring. By turning the screw in the opposite direction the plate A advances along the screw, the pressure is taken off the edge of the flooring board, and the cramp may be immediately removed by unscrewing about two inches and striking a blow with the hammer at M.

FIG. 2.

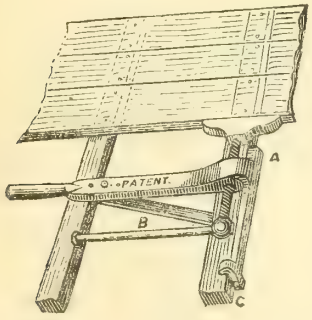
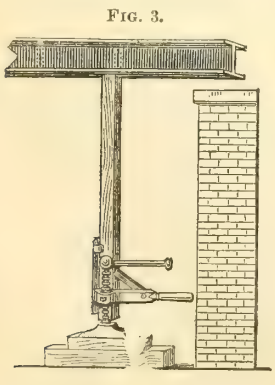


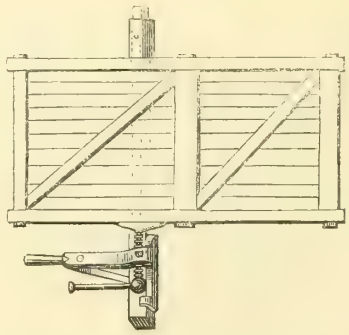
FIG. 3.



It is not likely to get out of order, will suit various thicknesses of joists or any kind of floor, and is specially adapted for fireproof floors where the joists are bedded on concrete. It is also very easy of application:—Place the cramp on the joist close to floor board, with the grip at an angle of 45; give the cramp a blow with hammer at A (see Fig. 2). Give another blow at B, and proceed with screw. To release the cramp, unscrew about 2in. and a blow with hammer at C.

Fig. 3 shows the cramp in use as a "Lifting Jack." By placing a deal underneath floor or girder, two cramps can be used, which will give a lifting power of between two and three tons. It will give self-gripping power to put a strut to any angle.

FIG. 4.



In Fig. 4 is shown its use as a carpenter's bench cramp, for heavy work, such as large doors or gates, or principals for roofing, which have to be framed on a stage. The cramp can be used for any bench purposes by laying the work on two deals. It may be had of Mr. B. Treeton, 30, Colchester-street, Leman-street, Whitechapel, or of his agents, Messrs. Eaton and Hewlett, 85, St. John's-street-road, E.C.

S. JOHN'S CHURCH, CROYDON.

THE newly-restored church of S. John, Croydon, was consecrated on the 6th inst.—the anniversary of its almost total destruction three years ago—by the Lord Bishop of London.

There is good evidence for believing that a church existed here in Saxon times, but which, like ethe buildings of this early date, was superseded by one erected during the 11th or 12th, with additions of the 13th and 14th centuries. This is attested by the fragments of mouldings and carvings of this date which were brought to light during the recent operations, and which are now preserved and placed under a recess in the south wall. Of the extent or plan of the early church nothing is definitely known. It was probably of small size compared with the structure of the 15th century, or Perpendicular period, the work, it is presumed, of Archbishops Courtney and Chichele. It then consisted of a nave of five bays, north and south aisles, with porches, chancels with aisles, in which were two chantries, that on the north dedicated to the Blessed Virgin, and on the south side to S. Nicholas. There was a rood screen, to which the staircase in the south-east column of the nave gave access, and a lofty tower of four stages was placed at the west end. This church was a beautiful specimen of the prevailing style, and was remarkable for the excellent proportions of its nave arcade, good window tracery and details, and the spiritedly carved grotesques used as label terminations and corbels. During the process of cleaning, in 1844, some fresco paintings were discovered, probably representations of S. James the less, S. Hilarion, S. George, and a king and queen. An altar tomb of the Perpendicular period, to the memory of Hugh Warham, brother of Archbishop Warham, stands in the chantry of S. Nicholas, and in the chancel were laid several brasses—one of a priest—Silvester Gabriel, vested in cassock, surplice, amess, or choir tippet, and cope, with embroidered orphreys, still remains; the others were to the remains of civilians, and of late date and inferior execution. On the south side were the monuments of Archbishops Grindall, Whitgift, and Sheldon. The beauty of these monuments was unfortunately destroyed by the disastrous fire before alluded to, and by which, in fact, scarcely the walls of the fabric were left standing. The restoration has been of the most complete character. The contract of Messrs. Dove Brothers, the builders, is upwards of £25,500, and Mr. G. G. Scott's commission as architect, £1,200; and the total cost is near upon £35,500. The architecture of the new building, as restored, is very similar to that of the old, being Early Perpendicular. The church is now lengthened to 182ft. by 81ft. wide; the height to ridge of nave is 55ft. The lengthening is in the chancel. The reredos over the altar is a most elaborate work in marble; it is divided into three compartments, representing the Birth, Crucifixion, and Ascension of our Saviour; above these compartments are white marble figures of S.S. Mark, Luke, and John. The new clock and chimes, which are of most elaborate construction, have been supplied by Messrs. Gillett and Bland, of Croydon, at a cost of about £2,000. The carving throughout, was executed by Messrs. Farmer and Brindley, and the lighting arrangements by Messrs. Hardman, of London and Birmingham. Mr. Prosser was the clerk of the works.

THE BUILDING NEWS SKETCH BOOK.

UPPER ARCADE, SOUTH TRANSEPT, WESTMINSTER ABBEY.

I SEND a sketch elevation of the upper arcade, south transept, Westminster Abbey. At the time of my preparing the sketch, I did not contemplate preparing a set drawing of it, and time would not allow me to notice the stained glass. The designs in the drawing are therefore inserted so as to give the general effect of the Arcade, more than the details of that part of it. The sketch was made for its *architecture*, but the omission of the stained glass will soon show how indissolubly interwoven are the cognate arts, though I believe it is generally entertained now-a-days that the stained glass business is out of the pale of an architect's calling. I cannot guarantee the correctness of some of the more minute carving, &c., in consequence of the great height of the work from the floor, and the dim religious light which permeats the building; but the remainder will be found correct. It is drawn in common *blackest* ink so as to make it bold, and better suited for the vigour of the photo-litho process.

JAMES HICKS.

WIDENING OF CITY STREETS.

AT the meeting of the City Commissioners of Sewers, on Tuesday last, Mr. Deputy H. L. Taylor said that the Metropolitan Board of Works, in constructing Queen Victoria-street, had set back the upper part of Queen-street, but there were still two or three houses projecting, which it would be well to set back also, in order to complete the improvement of the street. The leases of three of these houses would shortly expire; two at Lady-Day, and the other at Midsummer-Day; and before fresh leases were granted, it would be desirable, if possible, to secure the property, and so avoid the payment of heavy compensations. It was resolved to refer the matter to the Improvement Committee to consider, and that they confer with the Metropolitan Board of Works, and report thereon to the court. At the same meeting, a letter was read from the clerk of Cripplegate Ward Within, forwarding a resolution passed at the wardmote on S. Thomas's-Day, as follows:—"That houses Nos. 8 to 11, and 24 to 27, Gresham-street, inclusive, project into the street, whereby the footpath and roadway are contracted, and such obstruction should be removed as soon as possible." In support of this resolution, it was urged that the widening of Gresham-street would greatly relieve the Poultry. On the other hand, it was urged by the chairman (Mr. Deputy De Jersey) that the narrowest part of Gresham-street was 15ft., and the other part not intended to be altered was only 18ft. To do any good, the street ought to be widened to 30ft. or 40ft., and that would cost several thousands of pounds. Ultimately the matter was referred to the Finance and Improvement Committee for consideration and report. A letter was also received from the churchwardens of the parish of All-Hallows the Great, and All-Hallows the Less, informing the Commissioners that the obstacles which stood in the way of carrying out the arrangements contemplated in the years 1864-5, for widening Upper Thames-street, by taking down the vestibule of the parish church, had been removed, and that they were now prepared to render their assistance in furthering the matter on the terms previously arranged, if the Commissioners were now willing to proceed with it. This was also referred to the Finance and Improvement Committee.

ST. PAULS SCHOOLS
STRATFORD
ESSEX

HENRY OUGH : ARCHITECT.

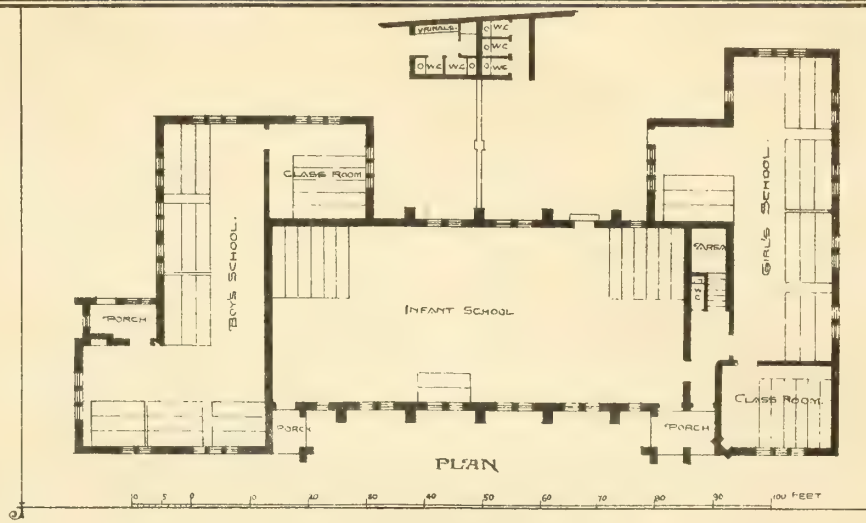
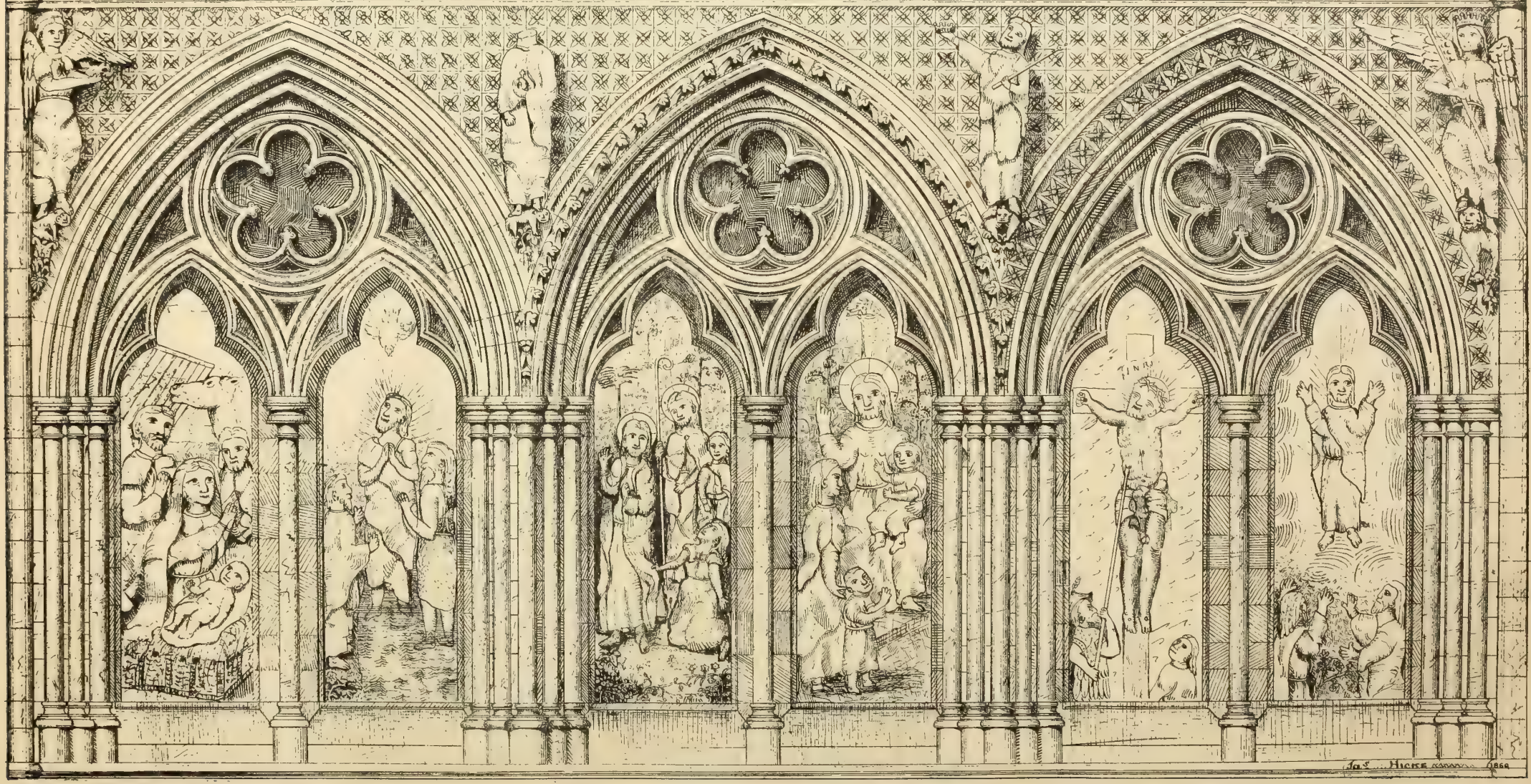


Photo-lithographed by Whitehead & Lyes, London

Sketch Elevation of Upper Arcade; South Transept, Westminster Abbey (Interior)



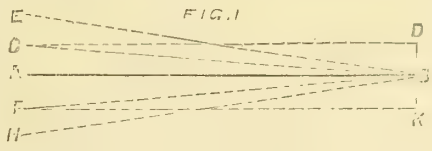
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The Surveyor.

THE THEODOLITE.

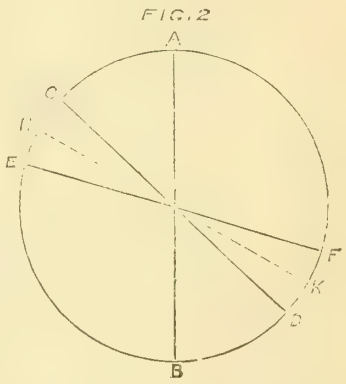
WITH a good chain and a five-inch theodolite a surveyor should be able to carry out any work in the field that could possibly devolve upon him. All the various operations connected with trigonometrical surveying, traversing, laying out curves, and setting out tunnels, sewers, or any other similar engineering works, are most accurately performed by the use of the chain and theodolite. A complete acquaintance with this invaluable instrument is indispensable to a surveyor. We do not mean simply a knowledge of the method of using it and of registering observations by it, which could be done by an automaton, but a thorough and intimate knowledge of its various parts, the errors that are incidental to its use, and the means of avoiding, detecting, and correcting them. Some of this information can be obtained from text books, but the greater part of it is not to be found in their contents. It is this latter description of information that we propose, in the present article, to supply. We will suppose that our readers of the younger class know what a theodolite is, and if not, the sooner they acquire that elementary information the better.* In selecting a theodolite there is one important point to be ascertained at first, and that is that the vertical axis of the instrument has been truly and accurately ground. If this be not the case, the evil can never be remedied, except by the maker, and it will be impossible to register observations correctly. To ascertain whether the axis has been properly turned, set up the instrument as nearly level as can be done by simply moving the legs, clamp the lower plate, and unclamp the upper or vernier plate, and bring the bubbles to the centre of their tubes, by the parallel plate screws, in the same manner as with an ordinary level. The instrument will then be level. Now clamp the vernier or upper plate, unclamp the lower, and turn the two clamped plates round together. If when this is done the bubbles of the bubble tubes still remain in the centre of their run, the axis has been truly ground, and the theodolite so far is a good one. It will be well, before going further, to explain what is meant by a five-inch, six, or seven-inch theodolite, as a similar mistake is often made to that entertained regarding a level. It is frequently thought that by a 10, 12, or 14-inch level, an instrument is meant which has those relative longitudinal dimensions, whereas they only apply to the focal length of the glasses. The term 5-inch has nothing to do with the focal or any other length of the part of a theodolite, but signifies that the diameter of the divided or lower plate has that dimension. As the larger the diameter of the divided circle, so the greater is the number of subdivisions, and consequently the accuracy of the instrument. At the same time, the weight of a theodolite increases considerably with an increase in the size of the divided plate, as all the parts must be made proportionally stronger. Its portability, therefore, becomes diminished, and as engineers and surveyors have often to shoulder their own levels and theodolites, and walk many miles over rough ground with them, the weight is an item of great importance. Some professional men on this account prefer a four-inch theodolite, but this is too small for accurate work, while others, with a disregard to the same contingency, advocate the use of a six-inch. The latter is a very heavy instrument. The true mean will be found in the size mentioned at the commencement of our article. It is quite large enough for all practical purposes, and at the same time not too heavy to carry about with safety. A surveyor should be careful to whom he entrusts the carrying of an instrument that costs five and twenty pounds.

Having ascertained that there is no defect of construction in the axis of the theodolite, a glance should be given at the manner in which the bubble tubes are mounted. These are generally mounted with capstan-headed screws at both ends, but sometimes, especially in both theodolites and levels of the most modern make, they are mounted with a hinge at one end and a single screw at the other. This is by far the best method of mounting them, as they retain their adjustments more permanently. There is this difference to be remarked respecting their nature, and it is necessary to be certain that in the latter plan it can never happen that the hinged end should ever require lowering. The following diagram will render



our meaning clear. Since the bubble always runs to the highest end, there is manifestly no necessity of raising or lowering more than one end of the tube, provided the other be free to pivot upon a hinge, but not to have any vertical motion. In fig. 1 let A B represent the correct position of the bubble tube, when the instrument is properly set up and levelled. Let A be the screw end, and B the hinged extremity, which it must be borne in mind cannot by construction be raised or lowered. Suppose the level tube to be deranged, and the screw end to occupy the position shown by the dotted line C B. It is evident that it may be restored to a horizontal position either by lowering the end C to the point A or raising B to the point D, the line C D being parallel to A B, and therefore horizontal. But as the end B cannot be raised, the only alternative is to lower C. So far, so good. But suppose the instrument is badly constructed, so that, after lowering the movable end as much as possible, that is, screwing it down as far as the screw will go, it still remains too high. Obviously, there is no remedy without sending the instrument to the maker to have the bubble-tube taken off and remounted. Referring to the diagram for an illustration, suppose the end A to be deranged so as to occupy the position shown at E, and that after screwing it down as far as possible it can only be brought to C. The bubble tube will then occupy the position shown by the dotted line C B, and will be always out of level until remounted. A similar contingency is represented by the dotted lines F B, H B on the lower side of the line A B, on the supposition that that the movable end at A has been lowered by derangement instead of raised. In the extreme case we have selected, it is supposed that the end A which was at H could not be raised higher than F, and as B could not be lowered to K, the position of the bubble tube would be represented by the dotted line F B. We fancy we hear many of our young readers exclaim upon reading this explanation, "Why not set the bubble tubes accurately level in making the instrument, and then they would never need adjustment?" This would be the simplest method of getting over the difficulty, were the bubble tubes the only part of the instrument that can become deranged. But the truth of the matter is that the bubble tubes themselves rarely get out of adjustment, although when a bubble will not remain in the centre of its run, or nearly so, when the instrument is turned round on its axis, it is the common remark, "Oh, the bubble is out;" the fact is that the bubble tube is not out at all, but some of the motions of the instrument have become slightly deranged. In adjusting the bubble tubes there is this important practical point to be borne in mind—that the more the movable end is screwed down, the steadier and more permanent the position of the tube will be, and the less likely to get out of order. In purchasing a theodolite or a level with the bubble tubes mounted on a hinge, if when the instrument is set up and levelled the movable or screw end of the tube is raised much above its bearings, it should be rejected, as the tubes will never be steady under the least rough usage. When all the parts of a theodolite or level are fresh from the hands of the maker, all the adjusting screws should be nearly "home," and the "instrument will then be in what is termed permanent adjustment." An experienced surveyor who has sent an instrument to be adjusted by a maker, will know by the way in which it has been done, whether it has passed through the hands of a man who understands his business.

The next point to be considered with respect to a theodolite is the position of the verniers. These are two in number, placed opposite one another, that is at a distance of 180 degrees apart on the divided limb. The verniers are sometimes fixed at the proper distance apart in the making of the instrument, and at other times are movable, so as to be capable of accurate adjustment when required The object of having two verniers is to ensure great accuracy in the observations. When this is needed the angles are read off by both verniers and the mean taken, which tends to reduce any small error that might otherwise occur. In the diagram in fig. 2, let A B re-



present the normal position of the verniers of a theodolite, that is when they are both at zero, A being one vernier, and B the other. Suppose a reading is taken with the vernier B only, the angle read being equal to B D. But suppose also in the reading of the angle, an error is made in excess equal to D F, which would be equivalent to reading the angle B F instead of B D. One reading only being taken with one vernier, the error remains. But if when the angle B F is read by error, the angle A C be read with the other vernier, and the mean of the two readings A C and B F be taken, the error becomes reduced to D K or half D F. Instead of supposing the readings to be wrongly taken, if we imagine trifling errors to exist in the verniers themselves, the same line of reasoning holds good. Trifling errors do exist in the verniers, and it is for the purpose of nullifying them that they are both used. In ordinary practice it is not necessary to use both verniers, but there is one thing to be attended to. The surveyor should always use the same vernier during the same series of operations. We are accustomed to make a slight scratch on one of the verniers in our practice, so as to be able to distinguish it from the other. When the verniers of a theodolite are fixed by construction, if they do not each coincide with the zero of the divided lower plate to within three or four minutes, the instrument is faulty. Having completed our remarks on the levels and verniers, there is still one more important consideration for the purchaser of a theodolite to attend to.

*The best and most concise treatise on surveying and mathematical instruments is Mr. Heather's little work, forming one of Weale's series. Every student and member of the profession should have it in his possession.

It is the verticality of Y's, or supports of the telescope. In some instruments, always in those of a large size, there is a separate adjustment for this purpose, but in many there is none, the supports being set vertical by the maker. To ascertain this, set up the instrument accurately level, direct the intersection of the cross wires to some well-defined vertical line, such as the quoin of a building, and move the the telescope up and down. If the intersection of the wires coincide during the whole motion of the telescope with the edge of the quoin, the construction is good, if not, bad, and it can only be rectified by the maker. An eminent mathematical instrument maker once gave us the following little piece of practical advice respecting the manipulation of a theodolite :—"Always turn your instrument in the same direction, either to right or left, but not indifferently backwards and forwards." The reason is that there is always some lubricating substance present between the axial bearings, and if the instrument be constantly turned in the same direction, this is always maintained in a smooth and even state. But when the rotation is backwards and forwards it gets rubbed up, and interferes with the evenness of the movements. As a concluding observation, we would strongly advise our readers never to purchase a cheap instrument, and when they have secured a good one to take care of it. A word more. Never tamper with the adjustments of a theodolite.

ON THE ENFRANCHISEMENT OF COPYHOLDS OF INHERITANCE.*

ALTHOUGH so many enfranchisements have been effected in recent years towards the abolition of a tenure which has long survived the necessities it was designed to meet, copyholds still exist in such vast numbers as to cause their enfranchisement to be a subject which intimately concerns most of those who are connected with this Institution.

A Lord Chief Justice of England in the reign of Charles II.,—and who appears to have been himself a "villein," though in the modern sense of the word,—left a posthumous work on Courts Leet and Courts Baron which has been a book of reference with later writers on copyholds, and which contains the following concise explanation of a manor :—

"As to the antiquity of manors, we find that the ancient kings of this realm, who had all the lands of England in demesne (*i.e.*, in their own hands), did grant a certain compass or circuit of ground to certain lords and great personages, with liberty to parcel the lands out to other inferior tenants, reserving such duties and services as they thought fit, with power to keep courts wherein they might redress misdemeanours and nuisances within such their precincts and punish the offences of their tenants, and debate and decide controversies of *meum* and *tuum* between them : the said lords performing such services and paying such rents, &c., as the said kings reserved by such their grants and donations. And these grantees, being formerly great lords and noblemen, were called barons, and came to Parliament, and from thence the courts so granted are called Courts Barons, as also the grantees are called lords, and the lands granted are called manors or lordships to this day ; though, in process of time, by grants and conveyances from such noblemen and barons, these lordships or manors came into the hands of knights and ordinary gentlemen by purchase, &c., and thus we find them to this day."

The grants of manorial lands and the services attached to them having thus originated with the will of the respective lords, it may be easily conceived that the benefit of the grants and the nature of the services were of very different kinds from the outset, varying according to the relation in which the grantees stood to the lords ; and, further, that these grants only gradually settled down into the specific customs now attaching to particular manors, and to particular tenements of the same manor.

The old knight-service or military tenure having been abolished, we first meet with the case of those who hold of manors as freeholders, originally, if not still, liable to render chief rents and heriots, and, in the case of a new tenant, a relief usually equal to one year's chief rent.

We then come to the class of tenants for whom it seems that the lords anciently held, not the freemen's, but the customary court, or court of the copyholders ; the court for those who claimed only by custom, and whose holdings were originally for the most part dependent upon the will of the lord, and subject to the performance of duties of a servile kind.

Among these, the nearest to freeholders in the extent of their rights appear to be the copyholders of frank tenure, or privileged copyholders, generally known as customary freeholders, and as paying rents, reliefs, and heriots, but whose base services in times past are said to have been limited in their nature, and not prescribed by the will of their lord. While these form the highest class of copyholds, the lowest comprises the unusual case of lands held for terms of years, and the common case of lands granted for three or more lives, in both of which, with very rare exceptions, the fines charged for renewals have not been made with such a certainty of amount as to have constituted a custom, and have invested the tenants with a right of inheritance.

Intermediately is the vast class of copyholds of inheritance, for the origin of which in this country we are referred to a period of serfdom—the state of transition from slavery to voluntary work through which, in one form or another, the common people and conquered races have ordinarily passed ; a period when the lords, instead of accumulating all the fruits that could be produced from their lands by the labour of those whom they had in subjection, saw that it would be more expedient to grant to some of them a tenure at will in the lands they cultivated, and to require a mixed tribute of money rent, of certain articles of produce, and of only a limited amount of direct personal service. It is gathered from history how the extreme power of the lords was often opposed by the influence of monks and prelates, and subsequently by the preaching of the friars ; and how it was weakened by the breaking up of baronial estates ensuing at one time from the crusades, at another from the wars of York and Lancaster, and frequently as a consequence of the extravagance of their possessors. We may fairly suppose that the serfs or villeins were less prompt with personal obedience whenever the manor passed from the baron class into the hands of meaner-born persons, sometimes the descendants of thrifty villeins ; but perhaps the modes, short of riot, by which they sought to work out their emancipation, are not so clearly known to us as to render uninteresting the following indication of what may be considered to have been the final stage of the process. I take it from one of the admirably systematic surveys of ecclesiastical property, made in 1649, by order of the Parliament ; and the case is that of a lord farmer who probably considered he had reduced his demand for his tenants' work to the smallest possible amount. The survey states :—

"There have beene heretofore certain Dayes Workes which the Coppyholders of yard lands and halfe yard lands aforesaid were wont to doe for the Lord by the plow in the Harvest time besides the Money Rents they paid as aforesaid. But it is alleadged by the Tennants that the said services have not bin of late required of them by the Lord of the said Mannor in regard the Dyett which the said Tennants claymed to have of the said Lord in the dayes they did the said service was accounted more chargeable than the said dayes worke were profittable."*

But before the question of servile work could have been thus narrowed, the grantees of what are now known as copyholds of inheritance had doubtless obtained their far surer footing than the original will of the lord ; and the words "to hold at the will of the lord according to the custom of the said manor" had ceased to be operative except as regards the second clause. The long-continued practice in a multitude of manors that the lands of a deceased tenant should be granted to some one standing to him within the degree of relationship prescribed by the customs, had come to be legally recognised as obligatory upon the lord ; and it would reasonably follow that the tenant should be allowed to sell or "alienate" the heritable interest which he possessed in the copyhold lands to a stranger who would pay for his own admission a fine usually very similar in amount to that charged to the heir. In several manors there are, indeed, strikingly exceptional customs on this point, and in others a fine is also due upon the death of the lord, not necessarily of the same kind as that charged on the admission of a tenant ; but these cases seemed fitted rather for special than for general consideration.

Just as the freeholders of manors were upon their accession charged a relief commonly equal to the annual rent to which their holdings were subject—just as first-fruits were similarly payable in the church,—the fine chargeable upon a copyhold tenant for his admission was perhaps in all cases originally equal to a single year's rent. In some manors we know a fixed fine is still charged equal to only one year's quit-rent, the actual annual value in time long past ; in others a fixed fine is charged of so much higher an amount that it would seem as if some later valuation of the copyhold lands had been agreed upon as the basis for future fines. In others again—those which are the principal subject of this paper—neither the ancient rent nor any later valuation has been adopted, but the fine is dependent upon the improved annual value of the land at the present time, and called fine "arbitrary," a term, which, indeed, can only be accepted in a "non-natural sense." For the fine, if absolutely arbitrary, might be put so high as to nullify the tenant's right of renewal ; and as it must therefore be proved to be customary and reasonable, the word "arbitrable," which appears to have been sometimes used, would be a happier term to employ even now. This term is found in a judgment which is quoted at great length by Mr. Serjeant Scriven in his treatise on copyhold and other tenures, and which contains very interesting particulars as to legal decisions that had been given respecting arbitrary fines. It was delivered about the year 1780 in the case of Grant and Astle, and the Court of Common Pleas by Lord Loughborough decided in the negative upon the question whether the lord of a manor was bound to make any deduction for land-tax in assessing the fine. From the extracts given from this very elaborate judgment, it seems that in the reign of Elizabeth the courts of law interposed to moderate the exercise of the lord's right to a fine where the custom had left the amount of it uncertain, and determined (though after conflicting decisions) that a copyholder's refusal to pay an unreasonable fine did not work a forfeiture of the tenement. It further appears that in the sixth year of the succeeding reign that of James the First, *two* years' value was adjudged to be an *unreasonable* fine ; and that there were cases in the fifth and twelfth of King Charles the First in which Lord Keeper Coventry's opinion was that one year's improved value was a reasonable fine. But forty years afterwards, namely, in the twenty-ninth of Charles the Second, Lord Nottingham held (though it seems in a very peculiar case) that *two* years' value was a *reasonable* fine ; and Lord Loughborough's judgment proceeds :—"At the time of this determination in 1677, two years' value was not a much higher payment than one year's value had been at the time of Lord Coventry's determination. The interest of money had been reduced, and from that and other causes the value of land had risen. One year's value might be nearly as large as an aliquot part of the selling price of land in the fifth of Charles the First as two years' value at the time of Lord Nottingham's determination. From that time to the present the idea of two years' value being a reasonable fine, in the case of a fine arbitrary (or, in the more proper phrase, *arbitrable*), has prevailed uniformly, and the adhering to this rule has been a matter of very great convenience, though it cannot be said to be a matter of strict justice"—on account, he continued, of subsequent reductions in the rate of interest.

But has this non-increase of the fine been really a favour to the copyholder, and not a mere act of justice? The doubt may be scarcely pardonable, yet it seems to me that an increased demand for land and a reduction of the legal rate of interest were inadequate explanations of the increase of the fine from one to two years' improved value. The greater demand for land did not warrant this increase of the fine, for it would find expression in the increase of the annual value itself. Again, the reduction in the rate of legal interest which took place during the Commonwealth, from eight to six per cent., and which was re-enacted at the Restoration, would effect the income of the lord from fines as well

* Read at the ordinary general meeting of the Institution of Surveyors, January 10th, 1870, by EDWARD SMYTH, Associate.

* The above is not extracted from the original, but from an official manuscript copy ; and the certificate of the correctness of the copy is probably not intended to guarantee the accuracy of the spelling.

as that of the copyholders ; it would increase the selling price of the manorial interest as well as that of the tenant, and it therefore did not afford a justification for the two parties sharing the profits of the copyhold lands in any other proportion than before. There seems room for the conjecture that many lords had gradually insisted upon fines on a somewhat increased scale, moved by a feeling of chagrin that, according to the ultimate decisions in the reign of Elizabeth, "the will of the lord" had ceased to have any value but that of a technical expression, and thinking it only fair to make the tenants pay something extra for the right of inheritance which former lords were found to have permitted them to acquire. In the Parliamentary surveys, to which reference has been made (written, it will be remembered, just about this period), there are occasional indications of such an exercise of the lord's option in requiring a larger fine than one year's value. For instance, of one manor we read :—"The fines payable for the said tenements upon descent or alienation are arbitrary, but usually between one and two years' improved value is accepted for the same ; " and of other two manors in the same county it is said that the fines were two years' value on death or alienation. It is, therefore, not improbable that during the period over which the above-mentioned judgments extend, the practice of obtaining from one and a half to two years' value as a fine had become very general.

But although the fine arbitrary had been limited to twice the improved annual value, after deducting for repairs, quit-rent, and other outgoings except land-tax, yet the circumstance of its being the *improved* annual value was adjudged to be prejudical to the national welfare to such extent as the tenants were thus deterred from improving their property by the consideration that part of the increased value they might confer upon it would flow into the pockets of the lord in the shape of fines. Again the heriot of a beast, or some other personal chattel (or its money equivalent), due in most manors from the estate of a deceased copyholder who has held lands upon which there is or was an ancient messuage, afforded a further inducement to the legislature to facilitate enfranchisements. Considered by some as having originated in the gratitude of the tenants to the lord for the tenure allowed to them ; by others as bequests to propitiate the lord's favour towards their children ; by others, and with perhaps greater probability, as exactions by the lord (with the object, it may be, of keeping up the stock of his demesne, the central home of the tenants), just as war-horses or arms were the heriots of freemen who followed their lord to the wars :—viewed in any of these lights, the original purpose of heriots had long ceased to exist, and they were seen to have often occasioned to a copyholder a risk of loss out of all proportion to the intrinsic value of the copyhold tenement he might have chanced to possess, from its intermixture with a large estate.

Therefore, to facilitate enfranchisment, the Copyhold Act of 1841 was passed, the Tithe Commissioners for England and Wales being appointed Copyhold Commissioners to direct its operation. Besides removing some restraints which had attended the renewal of copyholds, and also removing such impediments to enfranchisement as were owing to disabilities of either lord or tenant, the Act increased the inducement to tenants to enfranchise, by declaring that lands dealt with under it should be freed from all encumbrances affecting the manor itself. It also empowered the lord and a certain proportion of the tenants of a manor to enter into an agreement which should be binding upon all the tenants, and by which the lord's rights throughout the manor should be commuted for annual rent-charges variable with the price of corn, and perhaps to some future extent, or with sums of money similarly valuable, to be paid as fines either on death and alienation, or at such fixed intervals as might be agreed on. Or the lord might make an agreement with any one or more tenants for a similar commutation, applicable only to his or their tenements. Or the lord might make agreements with all or any of the tenants of a manor for the enfranchisement of their tenements, in consideration of the immediate or prospective payment of sums of money.

The Commissioners seem to have entered energetically upon their work—who that knew the late Mr. BLAMIRE could doubt it?—and in June, 1842, they made their first report. Very few individual enfranchisements had been completed, but they stated that one entire manor had been commuted, and another was in progress of enfranchisement ; and, undismayed by the peril of prophesying, they expressed their anticipation that the commutation or enfranchisement of whole manors would become popular and common. Their report ended with a suggestion that corn rent-charges, to arise from the lands dealt with, should be allowed as the consideration for enfranchisements, just as they already were in commutations. This was authorised by the Copyhold Act of 1843, by which it was also enacted that the consideration for commutations or enfranchisements of lands held of a manor might be taken in the form of a conveyance to the lord of other lands or rights, provided they were parcel of the same manor,—a proviso which was, however, repealed by the Act of the following year. In their report of this year, 1844, the Commissioners, still hopeful of dealing with a manor as a whole, advised that, upon the concurrence of the lord and a certain majority of the tenants, a compulsory enfranchisement of all the tenements of a manor should be effected, just as there was a power to similarly agree upon an entire commutation of the lord's rights. And three years later the Commissioners, in their sixth report, considered that the time had arrived when the concurrence of lord and tenant should no longer be necessary to a commutation. They recommended that any tenant should be empowered to call on the Commission to commute his uncertain payments, and to assign to the lord a consideration ; and further, that whenever two-thirds in value of the copyholders in any manor were commuted, the lord should be entitled to call on the Commission for a compulsory commutation of the remainder. With this view the then Commissioners desired that there should be given to them what, by the way, is very desirable for every one, and for surveyors above all, namely, "extensive powers of calculating prospective value ; " and they also desired to be allowed to decline to interfere at all in cases which they might consider very exceptional.

In less than five years afterwards the Copyhold Act of 1852 was passed, which enacted that in the case of any tenement to which the next admittance should take place, on or after the first of July 1853, the tenant should have power to compel an enfranchisement in consideration of a gross sum ; or the lord (subject to proving his title, if desired, to the satisfaction of the Commissioners) might compel the tenant to take an enfranchisement in consideration of the payment of an annual rent charge. Either of these considerations, or lands, &c., might (as before) be, by mutual agreement, the compensation for the enfranchisement ; and enfranchisement rent charges as well as commutation fines and rent charges need not be variable with the price of corn, but might (as advised in the Commissioners' Report of 1850) be of fixed amounts. To prevent hardships or injustice in special cases, the Commissioners were empowered in one section to suspend proceedings for enfranchisement, and in another to govern cases in which an enfranchisement would prejudicially affect the mansion-house and grounds of the lord. Common rights were to continue to attach to lands enfranchised under the Act ; and rights to mines, minerals, sporting, and royalties of other kinds were to remain undisturbed, except by consent.

The latest Copyhold Act (1858) superseded by fresh enactments a short Act that had been passed in 1853, mainly with reference to cases in which the lords for the time being had only a limited interest. It further repealed all the provisions of the former Acts, by which a tenant might be bound to pay for either commutation or enfranchisement a consideration to which he had not specifically agreed,—provisions upon which the original Copyhold Commissioners had relied, notwithstanding the many and cumbersome clauses that it had been found necessary to enact for the purpose. It also extended the right of compulsory enfranchisement to cases in which the latest admission had taken place prior to 1st July, 1853, providing, however, that if such enfranchisement were promoted by the tenant, he should tender the value of a fine and heriot, and two-thirds of the steward's fees,—a proviso which may be considered as having by this time lost its pecuniary importance.

The schedules appended to the Commissioners' Reports of late years enumerate transactions of an extent which is indicative of the thorough working order of the Commission ; and the terms of the reports themselves are varied only by occasional statements of the exercise of the Commissioners' discretionary powers in suspending enfranchisements which would have worked a hardship to individuals, the grounds alleged in several cases being an excessive estimate of the value of the interest of the lord.

Upon this important subject the Commissioners have published two documents, indicating the terms for enfranchisements. The first of these, issued in the early days of the Commission, stated, *inter alia*, that the enfranchisement from fines arbitrary was usually made at from 4 to 6 years' value of the tenement (*i.e.*, about 2½ fines), heriots being paid for similarly, at the rate of 2½ heriots on the average of the last three, and quit-rents being valued at 25 years' purchase. The commissioners offered this statement as only a rough guide for what were at that time comparatively rare transactions ; and, regarded as such, nothing need be said to its detriment. On the other hand the second document, issued in 1855, and having reference to enfranchisement from ordinary arbitrary fines, presents an appearance of the most refined exactness ; 3 years' purchase of the annual value is set down as the consideration for enfranchisement by a tenant of the age of 20 ; 5 years' purchase for one of 70, and for each intermediate age a year's purchase is given to six decimal figures.

Against this table Mr. Rouse, in his "Copyhold Enfranchisement Manual," brings a number of objections, the most noteworthy of which are, that the table does not extend to ages older than 70, and that it makes no distinction between fines arising from houses and those arising from lands. If it is indeed the case that the Copyhold Commissioners, when publishing this table, intended that no deviations from it should be permitted in respect of either the nature of the property or the extreme age of the tenant, then the table is certainly open to such objections. But if the Commmissioners merely wished to give for ordinary cases a sort of mean standard for guidance in respect of age, then, on adopting Mr. Rouse's statement of the fine occurring upon an average every fourteenth year, I propose to show in parallel columns that the values of such fines are about as nearly indicated by the Commissioners' table as by those which Mr. Rouse has prepared in its place. Few valuers, however, can have failed to be struck with the oddness of its giving to within the two-millionth part of a year's purchase the actuary's graduation of materials which are necessarily very coarse on account of the singular circumstances that in these holdings the fine paid upon the creation of any tenancy is irrespective of the age of the tenant admitted, and also irrespective of the rate per cent. which the particular property is supposed to yield as an investment, and further that a very similar fine may be repeated at any moment after an alienation.

However, although we all know that such apparent exactness in this matter is merely an extravagant fiction, there is no occasion to go to the other extreme, and to ignore almost entirely the business of an actuary, and trust to the lucky chance of a balance of errors. The proportion of a fifth of the fee simple value, or a sixth of it, or something between the two, is commonly agreed upon as the consideration for an enfranchisement ; but the adoption of this in preference to some other fraction, such as a third or an eighth, is based upon a calculation by some actuary in time past, and a thoughtful valuer must desire to have in his possession a table which shall enable him to make a reasonable allowance for every year's variation in the ages of the copyholders.

Mr. Scratchley, an actuary, and formerly a Fellow of Queen's College, Cambridge, has written a manual on the enfranchisement of copyhold property, but the main purpose of the book seems to have been the promotion of copyhold enfranchisement societies, which should have the good effect of helping tenants to enfranchise and improve their property, by making them advances of money secured through life assurance. As regards the terms for enfranchisement, I do not observe that he does more than give the established formula for finding the value of a series in perpetuity of fines of £1, payable by successive lives assumed to be all of the same age at the time of succession. The formula may be expressed in words as that of dividing one fine by the difference between unity and the present value of £1 pay-

able on the extinction of a life now of the assumed age. The quotient is the value of the fines of £1 in perpetuity, the first being payable immediately; and this value has, therefore, to be discounted for the term of such life as may be in possession. But he points out that the formula will require modification at the hands of the valuer, on account of the fines from copyholds being also payable at other times than upon inheritance.

Mr. Rouse, in his manual before referred to, has entered upon the subject very fully; and in addition to the arithmetical portion to which alone this review will refer, his work contains a large amount of, I believe, serviceable legal information, particularly his digest of the copyhold acts contained in the third and latest edition.

At pp. 97-9, he writes of the value of enfranchisement from fines when payable only on admissions after the deaths of successive tenants, and to such a case therefore the above-mentioned formula may be applied. Accordingly, the correct result (or nearly such) is given by Mr. Rouse for the enfranchisement to a tenant about to be admitted, and aged 44—which is here suggested by him as the average admission age—viz., (assuming 3 per cent. compound interest, 4·2 years' purchase, of which 2 he says are for the fine now payable, the remaining 2·2 being for the enfranchisement from future fines. He very properly goes on to intimate that if a life of an age younger than the average—one of thirty for instance—is about to be admitted and to enfranchise, the discount of the second and following fines will be larger; these being more remote, their value will be proportionably less than the 2·2 they were worth in the case of a life of the average admission age, 44—which is evidently the same in effect as deducting more than the fine of two years' purchase from 4·2 or the value of the fines in perpetuity. And he adds, "Should the value be required when there is a life on the rolls, the value of that life will be estimated in like manner."

It is surprising that after this perception of the principles of the case, Mr. Rouse, in passing from his explanatory remarks to his "Rules," should give for the same case a rule (No. 7, p. 115) which produces a widely different result. He here abandons the assumption of 44 being the age of the copyholders when admitted; and for the average value at three per cent. of the series of fines from the present time for ever he names 4·8 years' purchase instead of 4·2, basing the former upon an assumption which he here introduces, that, in the case of lands the intervals between the admissions will ordinarily be found to average eighteen years, whilst in the case of house property he suggests sixteen years. These intervals are however materially shorter than the expectation of life at the age of forty-four; and it is not shown why fines payable only after the deaths of the tenants should happen more frequently in the case of tenants holding houses than in that of tenants holding lands. However, the discrepancy in the values assigned by him in the two places to the perpetuity of the fines at three per cent. is of comparatively little moment; the more remarkable circumstance is the divergence between his remarks and his rule as to the allowance to be made from the perpetuity in respect of the age of the tenant on the rolls. The plan laid down in his rule is to deduct from the value of the series of fines only a single fine of two years' purchase in the case of the best possible life, and to deduct in the case of any other age a proportionate part of such two years' purchase; that is to say, he makes here no greater abatement in respect of the best possible life, a child, than that which he had properly shown in his previous remarks to be needed in the case of a life of forty-four; and makes indeed a smaller abatement than that which was rightly called for in the case of a life of thirty. *Both* of his plans cannot be right; it is the second which is erroneous. The circumstance that it is possible for a very young life to be admitted on payment of the fine is not apposite to the question, for the best possible life is extremely exceptional and not the average holding assumed in order to capitalise the fines. For the latter we might take a life of the average age of copyholders at the time that they inherit; and it is therefore on an enfranchisement to a tenant of this average age (as in his previous remarks) that the deduction of the two years' purchase should be made, a specific deduction of a greater or less amount respectively being needed in the case of a younger or older aged tenant.* I have dwelt thus much upon this discrepancy because, in the ordinary case of fines on admissions after death or alienation, to be next considered, Mr. Rouse has similarly framed his rule and tables with a regard to the best possible life, and its inapplicability is rather more readily seen in the case of fines only payable after the deaths of the successive tenants; but I am not acquainted with any manor in which this is the custom.

(*To be continued.*)

ST. PAUL'S NATIONAL SCHOOLS, STRATFORD, ESSEX.

THESE schools are erected in the parish of St. Paul, Stratford, of which the Rev. G. P. Keogh is vicar. The parish contains upwards of 10,000 inhabitants, principally of the labouring class, and (until the erection of the present buildings) was without schools. The works have been designed with the strictest regard to economy, and are built of stock bricks, with red brick dressings. They consist of rooms for boys, girls, and infants, with class rooms, and are designed, in accordance with the requirements of the Committee of Council on Education, to accommodate 550 children. The cost, including boundary walls and outbuildings, was £2312. Mr. James Rivett, of Stratford, was the contractor, and the rooms are heated throughout with hot water by Messrs. J. L. Bacon and Co., of Farringdon-road, E.C. Mr. Henry Ough, of Stratford, is the architect.

VENETIAN GLASS.

IN the Island of Murano, says the *Pall Mall Gazette*, the seat of the ancient manufacture of Venetian glass, there has been this last autumn a praiseworthy exhibition, with the purpose of reviving an essentially national industry. During the Austrian occupation favour was shown to Bohemian glass, to the prejudice of Venetian; but when the strangers left, efforts were made to direct the industry of the people into former channels. A few years since the friends of Italy were instrumental in opening an exhibition of the glass manufactures of Murano; and that first attempt has been now followed by a second and more extended effort, prizes are awarded, speeches delivered, and we can report, from a personal inspection of the works collected, that modern artisans are regaining the skill which made their forefathers famous throughout Europe. But the commercial difficulties appear to be scarcely less serious than the artistic. Fuel, as travellers know to their cost, is scarce and dear, and from this and other causes, the ordinary glass in domestic use can be imported at a lower price than made on the spot. Cavaliere Zanetti, who is doing much to raise the fallen fortunes of Murano, and to improve the condition of its industrial population, speaks of the manufacture of common glass as almost extinct in the island. Venezia, in fact, imports more than she exports. Italy is too much addicted to the ornamental, her art products are often at too great a distance from utilitarian uses, the genius of her people expends itself on trifles, and cares not for substantial support in commercial prosperity. Not a few of the articles exhibited in Murano are in design false and fantastic; they do violence to utilitarian uses. At the present crisis in the fortunes of Venice, capital and employment for labour are wanting; and Mr. Layard, Sir William Drake, and others, have been anxious to give new impulse to the manufacture of lace and of glass—art products evidently in keeping with the intuitions of the people and the traditions of the place.

* Adopting the notation of Mr. Peter Gray's classical paper on the "Theory of Successive Lives," in the second volume of the "Journal of the Institute of Actuaries," the value of the perpetuity of the periodical fines of £2, the first being receivable at the end of the year (of age) in which the present tenant, aged x, may die is

$$\frac{2}{1 - A_y} A_x = -\frac{2}{1 - A_y}\left(1 - \frac{1 + ax}{1 + P}\right) = \frac{2}{1 - A_y} - 2\,\frac{1 + a}{1 + ay}$$

When the present tenant happens to be of the average age of tenants at their admission (which we may put for the uniform succession age y in the formula), $x = y$ and we have simply to deduct 2 from the $\frac{2}{1 - A_y}$ which is the value of the fines in perpetuity when the first is to be paid immediately.

Civil Engineering.

HYDRAULIC ENGINEERING.*

OUR winter weather—for, as the French truly remark, climate we have none—has already conferred upon the country its annual contribution of destructive floods, occasioning an enormous amount of damage to property, and, in some instances, a loss of human life. As year after year these periodical visitations return with unerring regularity, it cannot fail to strike one that there must be something very defective and imperfect in our national hydraulic engineering. The control, maintenance, and repair of the river-ways of the country are of equal importance with those of the roads. In fact, to judge from the consequences resulting from a neglect of these duties, our rivers require the fulfilment of them far more urgently than our roads or even railways. All the great roads constituting the main arteries of inland communication were thoroughly well and skilfully constructed by engineers such as Telford, Smeaton, M'Adam, and others, and, with some exceptions, the majority of the county, parish, and district roads in England will bear comparison with those of any other country. From first to last, the mail coach roads were regarded in their proper light as great thoroughfares of traffic, and no pains nor expense were spared to render them safe and durable. Since the introduction of railways there may be some excuse for the neglect with which water-communication has been treated, but had our rivers been properly engineered previous to that era, they would never have fallen into the state they have, and become the annual scourges they prove themselves to be. Many of our rivers and streams have no mean between two positions. They must either be nearly dry or possess the properties of a torrent. Stagnant in summer, and impetuous in winter, they are useless in the former season and dangerous in the latter. It is by no means an uncommon circumstance to pass dryshod over a stream in the morning, and to find it at evening impassable by the most expert and daring swimmer. Similarly, during a drought, certain districts are absolutely destitute of water, while in others it is literally running to waste.

The origin of these irregularities in the currents of rivers is altogether to be traced to the circumstance that they have never been subjected to a systematic and efficient treatment by hydraulic engineering. Owing to rains, the access of surface water, drainage, and numerous other contingent additions to its volume, the channel of most rivers will at certain times be surcharged with water. In other words, their contents cannot be represented by a constant quantity, either physically or mathematically. Merely regarding the matter in a common sense point of view, it appears surprising that year after year, wealthy landed proprietors, large graziers, and farmers quietly succumb to such devastations. Expect them they must, yet they make no provision against them, but seem to regard the infliction as fated and unavoidable, with the same apathy and submission that forms the distinguishing characteristic of the Mahometan and the Oriental. Let us select as an example the state of the Irwell. A short while ago, the water rose 12ft. above the ordinary level, and in various parts of Lancashire the general appearance of the country was that of a succession of lakes, with little dry oases here and there in the shape of a farmhouse or a haystack. It is often remarked that farmers have no objection to the flooding of their grass lands, but, on the contrary, are glad to avail themselves of the fertilising influence of the water. This may be true enough, and were the effects of floods confined within limits so narrow and beneficial, there would be little to allege against their occurrence. But when towns as well as fields are flooded, bridges and boats carried away, sheep and cattle drowned, and human life jeopardised and destroyed, it is time to consider the matter seriously. However glad farmers may be to have their fields fertilised gratis, they should draw a distinction between irrigation and inundation. The former is productive of salutary effects only; the latter may fulfil the office of the former, but it is the cause of an immensity of evil as well, and a balance of good and evil will point out that the latter considerably predominates. As the agricultural and bucolic classes of a nation are invariably the slowest to avail themselves of any alteration or improve-

* From the *Mechanics' Magazine*.

ment in the stereotyped system of affairs, it is not so much to be wondered at that they make no attempts to arrest and obviate the consequences that are annually so prejudicial to their interests. It is possible that they may not be quite so supine in the matter as might be imagined. They may have made a calculation on the probable cost that they might have to incur to prevent such catastrophes, and may consider that on the whole it is preferable to let things take their course, and chance the floods. The line of argument would be as follows:—To properly control the course of the rivers and streams causing the periodical inundations, it would be necessary to have them, in the first place, thoroughly surveyed from source to mouth, and such engineering works constructed along their course as might be deemed necessary. These would consist of deepening the channels in some places, widening them in another, pulling down old bridges of which the waterway is too contracted, building new ones, and placing weirs wherever they might be required. Although we have stated that a calculation of the cost of these necessary works may have been made, yet it may be taken for granted that in ninety-nine cases out of a hundred such never has been the case. Instead of inquiring into the matter in the least, the landowners and agriculturists are willing to sacrifice the annual holocaust to the god of the inundating waters.

There are other parties besides these classes of the population who are equally if not more concerned in these fluvial depredations. It was asserted in a daily contemporary of last week that persons were prevented from entering the town of Bewdley from the Worcestershire-road by reason of the floods. It is not to be supposed that the whole burden of remedying this chronic state of things should fall upon the local authorities and ratepayers of the town, but it is to be expected that they would unite with any other persons equally interested in the matter in putting a stop to the evil. It cannot be a subject of indifference to the tradespeople and shopkeepers of the place to witness it on market and fair days rendered unapproachable except by the means of boats or swimming. Neither can the proprietors of large factories and business premises behold with nonchalance their lower stories under water, and their extensive yards and outhouses completely water-logged. The rise of the Trent this year has been within 18in. of the height to which the great flood of 1852 rose, to the imminent danger of the town of Nottingham. A portion of the Midland Railway near the station was flooded, but not to so serious an extent as to cause a stoppage of the traffic. Railway embankments, culverts, and bridges are occasionally damaged, and even carried away by inundations, but such occurrences are comparatively rare. It is easy for the engineer of a railway to place the permanent way *a l'abri* of such contingencies. By raising the embankment a few feet any great danger from floods may be prevented. In some situations the levels of the line will not permit of the increased height being adopted, and then the bank must take its chance with the open fields. It is quite time that the engineering of our rivers was taken in hand by the Government, since not even their own interests appear sufficient to spur private parties to exertion. A professional survey would speedily ascertain what works and improvements were necessary to effect the required alterations in the rivers, and a rate could be levied on all landowners, tenants, and other parties who were benefited by the water, to pay the expenses that might be incurred. In cases were the stream was navigated, a small toll could be levied on the traffic. The condition of our inland water communication will never be what it ought to be until some compulsory measures are taken to ameliorate it.

A NEW RAILWAY FOR EAST LONDON.

ONE of the largest of the railway schemes which will be brought before Parliament during the ensuing session is that of the East and West Metropolitan District Railway, which is planned to pass through the most populous portions of East London. The projected line has for its chief engineer Mr. Brunlees, whose name is known in connection with the Mont Cenis Railway. The proposed railway would place the inhabitants of East London in direct communication with various railways which already serve the northern and eastern districts, as well as with the railways south of the Thames, and give a direct communication from east to west. The deposited plans show the line to commence in a cutting at Gravel-lane, where it will join the Metropolitan Railway Extension. From that point it runs in a south-easterly direction into the Whitechapel High-street, east of Middlesex-street, otherwise Petticoat-lane. Thence it passes underground along High-street, Whitechapel, Mile-end, and Bow-roads, until it reaches the North London Railway terminus in the Avenue-road. The cost of the property required is comparatively small, and as the work is intended to be effected by tunnelling, there would be no interference with the ordinary traffic. The scheme is finding great favour in the East of London.

SCHOOLS OF ART.

NOTTINGHAM.—The prizes gained during the past year by the students of the Nottingham School of Art were distributed on Friday evening last, by Mr. Justice Mellor. The attendance was large. The President, Mr. Birkin, occupied the chair, and read the annual report, which was of a satisfactory nature, and showed the success that had attended the efforts of the committee.

ROTHERHITHE DISTRICT SCHOOL OF ART AND DESIGN.—A short time since the Government intimated that it must discontinue to supply the assistance by which this school has been hitherto carried on. A committee of management has therefore been formed, with the rector of Rotherhithe as chairman and treasurer, and Mr. W. Marillier as hon. sec., with the view of continuing this school (still in connection with Government, but on an independent basis). Mr. R. Hale has been appointed as the master. The school has been in existence for fifteen years.

Building Intelligence.

CHURCHES AND CHAPELS.

ARUNDEL.—The building of the new Roman Catholic Church at Arundel, Sussex, has commenced. The height to top of spire will be 250ft., and the cost will be £50,000.

COLCHESTER.—An adjourned meeting of the vestry of the parish of S. James, Colchester, was held on Wednesday week, to consider the means to be taken for the restoration of S. James's Church. The plans and estimate submitted by Mr. Teaton, architect, were discussed at length, and ultimately it was decided not to adopt plans for the present, but to make the first aim the raising of subscriptions. The sum required is between £4000 and £5000.

RUFFORD.—The new church of S. Mary's, Rufford, was consecrated on Tuesday. The new church consists of an unusually spacious nave, 60ft. long and 23ft. broad, the desire of the architects being to group the congregation principally in the centre of the church, so that as few of them as possible might be inconvenienced by the pillars of the arcades, which divide the nave from the aisles. These arcades consist of moulded arches resting on columns of Mansfield stone, with carved caps and moulded bases. The general style is Geometric Gothic, or Middle Pointed, and the materials used are red Rufford bricks, with black bricks introduced as bands and in arches, with Scarisbrick stone for dressings, window tracery, &c. It was built by Messrs. Sale and Hunt, of Southport, from the designs and under the superintendence of Messrs. Danson and Davies, architects, Dale-street, Liverpool.

LLANDOUGH.—On Thursday, December 30th, the church of Llandough, near Cowbridge, Glamorganshire, was re-opened after undergoing a thorough restoration under the superintendence of Mr. C. Buckeridge, architect. The south wall of the chancel has been re-built, and in place of the old wooden-framed window, three lancet windows have been inserted; the sedilia, credence, and piscina forming part of the sanctuary window. The two-light window of the east end has been replaced by a three-light window with two trefoils. On the north a doorway has been opened into a new organ-chamber and vestry; an arcade resting on columns of Radyr stone opens the organ-chamber to the chancel. The old chancel-arch has been replaced by a larger one, resting on columns of Radyr stone. The nave restoration consists of a new window, pulpit, floor of encaustic tiles by Godwin, and seats. The roof, too, has been boarded and slated, copings of Forest of Dean stone placed on gables and bell-turret, with crosses and weathercock.

MISTLEY.—The peculiar old parish church of Mistley, Essex (in the Italian style, with a tower at each end), having become so dilapidated as to necessitate re-construction, a new edifice, in the Early Decorated style, from designs by Messrs. Wadmore and Baker, of Great S. Helen's, Bishopsgate-street, has just been consecrated. Finding the old site to be extremely limited from the numerous graves in the surrounding churchyard, the new edifice has been built on a site given by the Rev. C. J. Norman. The foundations were commenced in December, 1868. The total interior length of the church is 100ft. 6in., of which the chancel occupies 27ft. The total width of nave and north and south aisles is 51ft. 6in. Projecting from the south aisle is a spacious porch and on the south side of the chancel is a vestry. North of the chancel is an organ chamber open to the aisle and chancel. The material used was Kentish rag, with Bath stone dressings. The nave and aisle roofs are open-timbered, but that of the chancel has a panelled ceiling divided with arched ribs. The chancel is paved with Maw's tiles. The pulpit and font are of stone. Sittings are provided for 540 adults, and 60 children. Mr. Hawkins, of Monks Eleigh, was the contractor. The amount of contract, allowing for the materials of the old church, was £4,367. The heating apparatus is by Dennis and Co., of Chelmsford. It is intended to add a spire, 142ft. in height, as soon as funds permit.

CARDIFF.—On Thursday, the 16th ult., a small iron church was opened for worship in accordance with the belief of the Evangelical Lutheran Church. It is situated near the basin of the West Bute Docks, the site having been granted by the Trustees of the Marquis of Bute, and is chiefly intended for the use of Scandinavian sailors who visit Cardiff. It is constructed by the well-known iron church builders, Francis Morton and Co., of Liverpool, London, and Glasgow, and comparing the low price (about £400) with its apparent strength and solidity, the comfortable accommodation it offers, is very creditable to that firm. The church will accommodate 160 persons comfortably, and there is in connection with it a reading room, which will hold about 30 persons.

BUILDINGS.

NEW TOWN HALL AND MECHANICS' INSTITUTION, STONE, STAFFORDSHIRE.—This building, which abuts upon the High Street, and occupies the site of the Old Blue Bell, is rapidly approaching completion—with the exception of the gas-fittings, iron gates, and painting, but little remains to be done. It comprises on the ground floor an entrance from the High Street, spacious hall and staircase, two waiting-rooms or committee-rooms, porters'-room, closets, side-entrance approachable from the gateway, and in the rear of the above the large hall; at the back of the large hall there are, besides another entrance, two retiring-rooms and closet, over which it is intended at some future day to erect a billiard-room. The works are being executed by Mr. Whiltome, of Gaol-square, Stafford, from the drawings and under the superintendence of W. Bakewell, of Nottingham. The entire cost of the building, inclusive of fittings, will be about £2,500.

BETHNAL GREEN.—Mr. Mundy, the Surveyor to the Bethnal Green Board of Guardians, has been instructed by that body to prepare plans and specifications for such an enlargement of the workhouse infirmary as would provide accommodation for about 150 additional patients, at a cost of about £1,800.

BRISTON.—The Vicarage House at Briston, in the county of Norfolk (after having been in a dilapidated state for some years past, a part only having been inhabited) has been put in good repair and considerably enlarged, at a cost of nearly £600. The work has been most satisfactorily carried out by Mr. Robinson Cornish builder, of North Walsham, in the same county under the superintendence of the architect, Charles J. Moxon, A.R.I.B.A., of 48, Albany-street, Regent's Park, London.

THE SHOP ARCHITECTURE OF BRADFORD.—Notices have appeared in this journal at various times of the great improvements which are visible in the shop architecture of Bradford, wider streets stimulating builders to erect more stately edifices. In some instances where the Corporation have opened out thoroughfares, they have imposed restrictions on the purchasers of land that the buildings erected should not only be of a certain height, but that they should have handsome and appropriate fronts to the principal streets. A handsome block of shops are completed in Tyrrel-street and

New Market-street, and another range is in progress adjoining. The fronts of the latter will be built of stone polished by machinery, certain difficulties in the manipulation of large blocks of stone by the machine having been overcome. The stone for the Mechanics' Institute will be prepared in the same manner. The finest shop, however, in the borough, indeed one of the largest in the West Riding, has been built in West-gate, and will shortly be opened. The town is indebted for this noble pile to the enterprise of Messrs. J. Illingworth, Son and Co., wholesale and retail drapers, who have spent nearly £12,000 on the land and premises. The building stretches from Godwin-street to Southgate, having a frontage of 120 feet to Westgate, which at this point has been widened. The premises are four stories in height, with an attic over, and at each end of the building ornamented turrets rise above the main roof. Externally the structure has a bold and striking appearance, a beehive in the tympanum of the pediment over the capacious entrance door testifying to the industry which has led to the erection of the pile, while the Bradford Arms, surmounted by the Boar's head, is placed in the centre and at the top of the front. The basement will be devoted to the carpet trade; the ground floor is the shop proper, well lighted by the external windows and by a large well-light at the back, carried up to the roof. On the next floor is the show-room and wholesale department. The stories above are to be occupied as store and stock-rooms, marking-off room, kitchen, dining room, bagatelle room, bath room, and reading room, with other conveniences for the assistants. A lofty attic, extending the whole length of the building, was intended to be devoted to sleeping rooms; but although this room is excellently lighted and ventilated, the Corporation bye-laws will not allow it to be used as a dormitory. The architects are Messrs. Andrews, Son, and Pepper, Bradford.—*Leeds Mercury.*

PENARTH.—A new hotel has just been completed at Penarth by the Taff Vale Railway Company; the architect is Mr. Bernard, of Cardiff. It is built in the Italian style, and contains fifty rooms

TO CORRESPONDENTS

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

P. O. O's to be made payable to J. Passmore Edwards, at the Strand Office. All cheques to be crossed on the Union Bank.

RECEIVED.—T. G.—J. B. J. H.—J. F and Sons—W. Y.—B. H.—J. J. C. and Co.—E. H. L. B.—J. T. M.—W. S.—S. and Co.—A. W. H. R.—J. H.—C. D.—J. N., jun.—W. S.

A. C.—Messrs. Merryweather, of Long-acre, W.C., and Shand and Mason, Upper Ground-street, Blackfriars.

STABLES, FARM BUILDINGS, &c.—Rawlingson Parkenson, architect.

THOS. BATTENBURY.—With sketch on transfer paper of Tower of Marolles Church, near Lisieux, for Sketch Book.

W. D. DOBSON.—The description came all right.

A. JOINER.—The salary paid to a clerk of works varies materially. It will depend on the character of the work, and the quality of the man.

A. GOUGH.—You can have the number by sending four stamps.

Correspondence.

METROPOLITAN DRAINAGE.

(To the Editor of THE BUILDING NEWS.)

SIR,—London seems to have had but a "hair-breadth 'scape i' the imminent deadly breach" of being overrun by a viler foe than ever threatened her before, for whenever the pumps at Barking fail, she will have cause to put up her shutters and lament as one indeed overwhelmed—

"For my particular grief
Is of so floodgate and o'erbearing nature
That it engluts and swallows other sorrows."

To give the reader a view of the matter, it may be stated that when the metropolis was to be furnished with a new set of sewers a public invitation was issued for plans and schemes. These were chiefly directed to the districts north of the Thames, and the difficulty experienced by the competitors lay in the drainage of parts whose surface was lower than the highwater level of the tide. Take as instances portions of St. James's Park and Westminster. The drainage of elevated places, as Hampstead and Highgate, was easy. The sewers would clear themselves by gravitation to the level of Piccadilly, and by making them from that point in the nature of air-tight pipes or syphons, their contents would flow incessantly. But into these syphons, from the commencement to the outlet, no open communication could be permitted, and therefore the only means for the special drainage of these depressed situations was that of conduits into sunk reservoirs, from which the contents could be mechanically raised and got rid of. Out of such conditions sprang the system now in use, and which an architect has recently described. Descanting on the benefits the new drainage by chief and intercepting sewers is calculated to confer, he says, "The high level, middle, and low level sewers are, in fact, so many aqueducts, and the last, being lower in part of its course than the river itself, has its turbid contents raised by pumping engines. These are capable of performing the work of two thousand three hundred and eighty horses, and of consuming forty-four thousand tons of coal per annum. By this depression of the drainage level there has been *pro tanto* a raising of the metropolitan area. The main sewers measure collectively eighty-two miles, and are fed by some thirteen hundred miles of old drains. The quantity of liquid passing daily through these channels is ninety millions of gallons, and even this large measure is sometimes quadrupled during rainstorms. The cost of executing the enormous work is estimated at four millions sterling; and its accomplishment must secure for Mr. Bazalgette a place among our foremost engineers,

"For neither Brindley nor Bridgewater did essay
To turn the tide of *Helicon* that way."

"Among the points of superiority," says the same author, "possessed by Rome over every other city of antiquity, few were more valuable than the drains or cloacæ, nor in the same utilitarian range has any modern capital proved a rival to our own. But pre-eminent as she has been in this respect, it was reserved for the present generation to conceive the comprehensive system, and to execute the truly wonderful and unexampled project, destined, perhaps, to furnish distant futurity with the most unique of all memorials of London's greatness." Then, as if impressed with the danger of the plan of which he had become the panegyrist, he adds, apostrophically, "Be never out of order, oh, ye dark, dark streams." It is indeed singular that before his pages are well out of the press, an accident to the machinery on which the order and effect of the whole scheme depends should have occurred. Why any serious accident should, in the absence of some natural convulsion, be possible, seems utterly astonishing. The work of two thousand three hundred and eighty horses might be reasonably apportioned among at least half a dozen machines, so that the necessary repair of one should be easy of accomplishment. All is governed by degree, and it is probable that current rumours may be more or less unfounded, but public anxiety cannot be too soon set at rest; for those concerned may be earnestly reminded that the simultaneous conflagration of all its stores of gas and oil, of petroleum and gunpowder, would be of less deadly consequence, less destructive to the convenience and habitable condition of the metropolis, than the total stoppage of its sewers. T. M.

HOFFMAN'S KILN.

SIR,—Permit me, as one who has had considerable experience in the working of Hoffman's kilns, to offer a few observations on the subject so ably dealt with in your paper of the 7th inst. The description given by Mr. Redgrave of the construction and working of this patent kiln is most graphic, and extremely accurate; his statement of its advantages is fair and clear, if not exactly coming up to the point of merit claimed for it by some, but in his concluding remarks he takes some minor objections to its general adoption; perhaps he thought so much praise would be better for some slight qualification.

Mr. Redgrave thinks it a point against the patent kiln that it requires "skilled labour" to pack it well; if pushed to the literal meaning of the words, I must admit this, as I cannot say that any common labourer could do it intuitively, but I think the *practical* value of such an objection is reduced to almost zero by considering what I know to be a fact—that any ordinary workman will acquire this small amount of skill perfectly by a fortnight's practice. There are many things called skilled labour that are nowaday entrusted to ordinary labourers, such as firing and driving farm engines and machinery, at—and this I think Mr. Redgrave will admit is *the point*—ordinary wages.

With reference to the deposit of s eam on coldest raw material inside the kiln, in my opinion, it is a fallacious point, for the steam in condensing imparts heat to the stone, and as radiation to the outer air is cut off, no more heat work is done by the fuel than if the steam escaped by a separate vent, and the stone were heated without the first assistance in that direction it got from the condensation of the steam.

Again, with regard to the effects of "alternate expansion and contraction," and that "in point of durability it cannot take a very high rank," I would only say that this is not the experience of the owners of any of the Hoffman kilns that I know of. I have been concerned in the erection and working of three in England and three in Ireland, and it is certainly not my experience. Mr. Redgrave alludes to "an army of men to manage it," forgetting, as it appears to me, that the question is not the actual number of men, but the compound ratio of their total wages, and the produce in tons of a Hoffman kiln to the corresponding items of an ordinary kiln—that is the commercial and economic question.

Mr. Redgrave will, I trust, excuse what I do not at all intend for criticism, but as a statement of how my experience leads me to differ from a few of his conclusions.—I am, Sir, &c.,

CHAS. E. BAPULL, Secretary.
The Boston Lime Company Limited.
Dublin, January 12, 1870.

THE *BUILDING NEWS* SKETCH BOOK.

SIR,—Permit me to add a suggestion to those of Mr. Jaques in your last number. In place of confining the Sketch Book to ancient monuments, or even to modern buildings, as that gentleman proposes, might it not be thrown open to sketches of original designs? I think this would excite the emulation of students, and if criticism were invited, and the drawings fairly discussed, it would give confidence and self knowledge to the contributors. The want of fair and competent criticism is the cause of many shortcomings in our architects, and much public ignorance. The highest talent in the kingdom is employed on literary criticism; if it were not so our literature would not stand where it does. If this suggestion were adopted there would be much greater necessity than at present for increasing the limit to the number of sketches from each.—I am, Sir, &c., CONTRIBUTOR

Jan. 5.

THE TOWN SURVEYORSHIP OF LEAMINGTON.—A HINT TO CANDIDATES.

SIR,—I have received the particulars of this vacant appointment, as advertised in your paper, and was highly amused to see it stated as one of the stipulations as to the engagement, namely, that the "surveyor must not be absent from the town without obtaining the consent of the Board or its chairman!" Probably the Board will compel the surveyor to wear livery. No doubt with such a commencement it will turn out a good situation for any professional man who can carry the required weight.—I am, Sir, &c., C. E.

THREE CISTERCIAN ABBEYS OF YORKSHIRE.

SIR,—The learned writer of the above has by what he pleases to call desecration, given a tinge of bigotry to an otherwise unobjectionable article, and by attempting to brand such a harmless act as eating among the ruins of an abbey, he has weakened any just protest against destruction and injury to those venerable remains. By classing superstitious fancies with proper objections, the latter may unfortunately meet with the contempt the former are pretty sure to have. The history of monastic institutions would cause many to wonder which god they really did belong to before. It is hard to please all parties, and I don't know whether being marched round by intelligent guides would increase the pleasure of visiting such places; at all events it has been objected to at Westminster Abbey and other places where it is adopted.—I am, Sir, &c., R. H.

THE RESTORATION OF CARNARVON CASTLE.

SIR,—In reply to your correspondent, dated 3rd Dec., relative to the trifling works in progress at Carnarvon Castle, and the incompetency of engineer officers giving proper instructions to the workmen, seems rather a vague statement, and especially so when "F. R. I. B. A." says that he made but a hasty inspection of the works then in operation.

Doubtless, the ancient building in question is of sterling value, both to Government and the Archæological Society. It is, however, difficult to comprehend from your correspondent's remarks how the removal of *debris* from the base of the building, and the erection of an iron railing on the edge of the moat, can be termed "restorations," and why such simple and valuable service should deteriorate from the appearance of an ancient relic, and why, for such a small amount of work, "F. R. I. B. A." would recommend a Gothic architect be specially employed to superintend it. As regards proper directions being given to the workmen by the engineer officer, it is not imperative on him to do so; such matters are invariably involved on the clerk of the works, who, in conjunction with his officer, zealously and carefully superintends every work in their charge, and at all times affords every facility to the contractor, his agent, and workmen, with the necessary working drawings and instructions, for the expedition of the work, in a fair and workmanlike manner.

from the commencement to the completion of every service. Indifferent tradesmen there may be employed at times on public as well as on private works. Unskilful workmen, inferior materials, &c., have but a short duration in the R. E. Department. The contractor's early attention is drawn to the terms of contract, which he cannot depart or digress from in any respect. It is well known that barrack buildings are void of much design; but they are solidly built, heated and ventilated—such as is required for the British soldier. It is true also that an engineer officer has a great deal to do, and so has the clerk of works in his division, in looking after the works in barracks and fortifications generally, but it does not follow, because one has constant designing and supervision of such works, that he is incapable of restoring or building Gothic work; and I can assure "F. R. I. B. A." that there are those in the R. E. D. who entertain the highest respect for ancient art. Trusting, when he next visits Carnarvon Castle, the minor repairs he mentions may have been executed to his entire approbation, I am, Sir, yours, &c.,

C. W., R. E. D.

MIDLAND COUNTIES IDIOT ASYLUM COMPETITION.

SIR,—Will you kindly allow me to say in reference to this competition, and in answer to numerous inquiries, that the Building Committee intend exhibiting all the competing plans before the final decision is given, and the award made, unless any competitor should intimate to me, under cover of his motto, his objection to his design being exhibited. I am, Sir, &c.,

W. G. BLATCH, Secretary.

24, Waterloo-street, Birmingham, Jan. 10.

Intercommunication.

QUESTIONS.

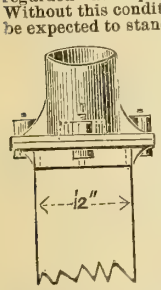
[1738.]—STOVE.—I should be glad if some of your readers would inform me if there is a detached stove made (suitable for the hall of a gentleman's house) which consumes its own smoke, so as to do away with the necessity of a flue, and if so where it is to be procured.—J. H.

[1739.]—GROINED VAULTING.—Can any of your readers kindly inform me of a simple method of measuring groined vaulting, semi, in one case, and segmental in the other in section.—J. W.

[1740.]—A QUERY.—I shall be obliged if any of your numerous readers will give me some information as regards the following:—Whether I, being a minor and under the age of 21 years, can be compelled to take in a work after having signed a paper so to do. I had the first number gratis, and finding that the second number is not so well executed as the first, I am anxious to return them both to the publisher's agent, and give up the contract; and if there are any cases which have been tried, and in whose favour decided under such circumstances?—A YOUNG SUBSCRIBER.

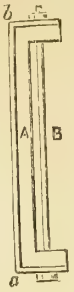
REPLIES.

[1711.]—SUPPORTING CAST IRON PILLARS.—There is no doubt that the method of supporting cast iron pillars on the tops of piles as given by "Viator" in your columns of the 24th ult. is very defective. It violates the very first condition essential to the stability of a column, viz., that it should be properly bedded. In fact, the columns given in the sketch of "Viator" have no bed whatever, and could not be regarded as "pillars firmly fixed at the ends." Without this condition being fulfilled they could not be expected to stand any strain. I give in the annexed sketch, drawn to a scale of an inch to a foot, a secure plan for fixing pillars to wooden supports. A cap is placed on the top of the pile, a bed for it being obtained by reducing the dimensions of the pile until the top fits inside the casting, as shown by the dotted lines, so as to bring the faces of the cap and the pile flush with one another. This cap has a flange 1½in. thick, furnished with 4 1in. bolt holes. The pillar is cast with a base corresponding to this cap, and also furnished with 4 holes The pillar is placed over the cap, and firmly bolted to it by 4in. bolts, as shown in the drawing. This beds the pillar, truly and firmly. It will not do to bolt the pillar and cap to the pile itself with screw bolts, because screws will not keep their hold in the direction of the fibres of the wood.—T. C.



[1714.]—STRENGTH OF ROOFS.—The second roof is the strongest, because while the directions of the strains, and the amount of them also, supposing them both to be equally loaded, is the same, there are fewer pieces in it than in the first. A reference to the diagrams will show that in the second roof the strains, which must all ultimately be transferred to the two side walls, are conveyed thither directly by the inclined rafters situated between the queen posts and the tie rod. In the first instance this is not the case, as the sloping rafter is replaced by two other pieces having different angles of inclination. They are neither of them at all good specimens of a truss roof.—CARPENTER.

[1718.]—BRACED ARCHES.—"Calculator" must be careful how he attempts to make up combinations of cast and wrought iron. This was the way in which the early cast iron girders intended for large spans were strengthened, and some of the results were attended with great loss of life. It is true that many of these combinations were exceedingly unscientific in design, and also badly constructed; but even at the present day, engineers who are well used to the designing of iron structures hesitate a great deal to give their sanction to such compound designs. The annexed sketch will illustrate the danger. Let A be a casting, and B a bolt passing through the upper and lower members of the casting as shown, and being screwed home tight. Now, if we imagine the casting to expand more than the bolt, it is clear that it must either wrench off the head or nut of the bolt, or itself break at the angles *a* and *b*. If, on the other hand, the bolt expand more than the casting, it will work loose, and thus be of no more use in construction.—S. S. L.



[1721.]—WEBS OF PLATE GIRDERS.—The strains upon a plate web may be readily calculated from the formula $S = w \times x$ where S is the strain, w the weight per unit of length, and x the distance of S from the centre of the girder. In the example given by "F. J." the half span of the girder is 14ft., and we may obtain the strains at three different points, which will be sufficient for all practical purposes. At the centre $x = o$, and, therefore, $S = o$. At 7ft. from the centre $S = 1 \times 7 = 7$ tons, and at the abutment $S = 1 \times 14 = 14$ tons. Whatever may be the theoretical value of the strains upon the web, it must not be made thinner than ¼in. metal.—ENGINEER.

[1724.]—POWERS OF NUMBERS.—For the benefit of "Inquirer" and others, I give 25 to the power 3·55 worked out by logarithms sufficiently near for practical work. Log. of 25 = 1·39794; 1·39794 × 3·55 = 4·9626871. The number answering to the log. of 4·9626870 will be 91,765·00 practically. Consequently, $(25)^{3·55} = 91765$.—Q. E. D.

[1726.]—FLOOR PLATE.—When "X. M." takes into consideration that the ends of iron joists a foot deep are frequently let into the walls of buildings, he need not be apprehensive of such a trifling piece of iron as he proposes to use.—B. B.

[1735.]—DUTIES OF ARCHITECT'S PUPIL.—(Funny reply.) "Q" will find that the following answers show the light in which the duties of architects' pupils are generally considered:—1. No particular duties. 2. He is not bound to give his undivided attention to his master's work; if he enters an office as a pupil, and then finds he has to work for his master's interest, and not as a pupil, who ought (see No. 1) to have no particular work assigned to him, but ought to be allowed to do anything calculated to advance him in his profession, then it is an imposition. 3. He is not bound to run errands, or do anything of the sort; an office boy ought to be kept for the purpose. 4. He is not bound to attend office regularly, because as "Q" says "it would leave him no time for outdoor study," which is one of the essential elements of a pupil's education. Of course he ought not to make a practice of absenting himself from business.—J. K.

STAINED GLASS.

TAMWORTH.—TESTIMONIAL WINDOW TO DR. MILLAR.—The General Committee have accepted the design sent in by Mr. Wailes, of Newcastle. The design consists of the figures of the Twelve Apostles, bearing appropriate symbols. Above and below are angels bearing scrolls. The figures are bold, and the colouring beautifully rich, and no doubt a very handsome window will be produced. The glass for the painted window will cost £270, and the necessary repairs to the stonework of the window, and other expenses, about £80. A painted window, which will cost about £150, is to be placed in the south transept, to the memory of the late Rev. F. Blick, for about 40 years vicar of the parish. This grand old church is now undergoing thorough internal restoration, and it is hoped will be enriched with other stained windows.

WATER SUPPLY AND SANITARY MATTERS.

SALE.—The Sale Local Board have received permission from the Secretary of State to borrow the sum of £15,000, to be repaid in 30 years, to defray the cost of sewering the township, and they are in communication with the Public Works Loan Commissioners with a view to obtaining a loan. There are 75 applications for the office of surveyor to carry out the work. The Board have resolved not to go beyond a salary of £175 per annum in making the appointment.

METROPOLITAN WATER SUPPLY.—As before stated in THE BUILDING NEWS, it is not improbable that the interests of the eight water companies in London will be purchased and placed in the care of some central body—possibly the Metropolitan Board of Works—so as to ensure a constant instead of an intermittent supply. The advantages which would result from this plan in respect of health and cleanliness are unquestionable, but the difficulty at present is to decide what body shall bear the responsibility, as the Metropolitan Board, having already as much as it can manage or *mis*manage on its hands, has not, we believe, shown any desire in this direction. The answer of the various companies to the appeal for a constant service is that to give a permanent supply they must have power to enforce a rate, but, as a local contemporary justly observes, the ratepayers of London would be very unwilling to have their rates levied by a company conducted for the purpose of making profits.

THE ARTISANS' DWELLINGS' ACT IN S. LUKE'S.—At a recent meeting of the S. Luke's vestry, a report from the surveyor was read, describing the state of four houses in Forster's-buildings, which had been referred to him by the Sanitary Committee in order to ascertain what structural alterations would be required to render them fit for human habitation. The surveyor was of opinion that structural alterations would be insufficient, as the houses were in a very dilapidated condition, thoroughly worn out and tumbling to decay. The only remedy for the evil would be to demolish the premises. The report of the surveyor was adopted, and the houses in question, together with some premises in Wood's-place, will be demolished.

STATUES, MEMORIALS, &c.

NEW MONUMENT AT HARROW.—Among the recent memorials erected in the churchyard of Harrow-on-hill, the monolith placed upon the Leighton family vault is not the least remarkable, considering its material, great weight, and the quantity of workmanship thereon, apart from its site and the difficulty of poising it there. Six years ago such a block could hardly have been executed; and now perhaps it is the largest block of polished granite that has crossed the Scotch border, exceeding even the rough hewn pediments on the Thames Embankment. Three huge masses were squared up prior to one being found sufficiently pure for the purpose, and that had to be polished by a portable engine taken up to it in the quarry, as it required a steam crane of great power to turn it about with facility. It was executed at the works of Messrs. Newall, Dalbeattie, near Dumfries, and great difficulty was experienced both by road and rail in bringing it to its destination. The design of the monument is Mr. Leighton's own, and is Italian Gothic in style. The whole block was once polished, the form being "fine-axed" out of the square afterwards. The eight shields introduced are of serpentine marble, from Cornwall. The three gables it was intended to decorate with painted *faience*, though now it is thought mosaic will be more durable; thus the work will be rendered either at the Vatican works in Rome or in Venice. The door is of oak, bearing an incised pattern and bronze stads. When finished the top will be surmounted by spheres of red and blue granite, polished, and an Angel of the Last Judgment bearing a trumpet, or by S. Michael vanquishing Sin. This will come from a Paris foundry, thus rendering the work not unworthy of the terrace at Harrow. Owing to the sandy loam on which the superstructure is placed, much difficulty was experienced with the foundations, which will have to bear twelve tons, and that on a slope.

LEGAL INTELLIGENCE.

ARBITRATION CASE, NOTTINGHAM.—HIND V. THE MIDLAND RAILWAY COMPANY.—The hearing of this case, which had stood adjourned in order that the claimant's books might be examined, was resumed on Thursday, January 6, at the George Hotel, Nottingham. Mr. Philbrick appeared for the claimant, and Mr. Field, Q.C., represented the company. The arbitrators were Mr. Cawley, M.P., and Mr. Goddard, Mr. Pownall acting as umpire. The claim, £3000, was supported by Mr. Evans and Mr. Williamson, surveyors, and Mr. Nicholson, of Newark. On behalf of the Company, Mr. Tarbotton, Mr. Huskinson, Mr. Norris, and Mr. Bakewell valued the injury sustained at sums ranging from £420 to £520. The particulars of the claim appeared to have been that the claimant had been deprived of the use of a portion of the West Croft Canal in consequence of the Midland Railway Company having filled up the canal, and the ground was occupied by their works. The claimant alleged that in consequence of the filling-in of this part of the canal he could no longer get his heavy goods alongside his wharf in barges, and considerable inconvenience was caused. He was obliged to send his heavy goods by rail where he formerly used the canal. After hearing a good deal of evidence, Mr. Field, Q.C., on behalf of the railway company, did not deny that there had been a certain amount of "estate" damage, as he would call it, but it did not appear that there had been any trade damage at all by decrease of profits. He considered the amount of the claim most exorbitant, and did not think the claim of trade damage would have been set up except for a morbid desire to get as much as possible out of the railway company, and had no doubt that when the claim had been satisfied Mr. Hind would relinquish his lower wharf and concentrate all his business at Queen's-road.—The arbitrators will take time to consider their award.

BREACH OF CONTRACT.—BARKER V. PRESTEIGN BURIAL BOARD.—This was an action recently brought in the Hereford County Court, by Mr. E. H. Lingen Barker for the recovery of £50 for services rendered by him in his profession as an architect. The facts elicited by the evidence may be summed up as follows:—In 1866 the Burial Board of the town of Presteign invited several architects to submit designs in competition for the erection of two chapels, and eventually

accepted the one sent in by plaintiff, on condition that it could be carried out for £700. In due course, plaintiff was formally instructed to make the working drawings, to send a copy of the plan to the Lord Bishop for approval, and to have bills of quantities prepared for the builders; a resolution was also adopted agreeing to the payment of 5 per cent. on the outlay for drawings and superintendence. At the time when the advertisement was inserted in the local papers, a strike existed in the trade, so that only two builders came forward, and one of these retired from the field at the last moment. The remaining tender, on being opened, was found to be within the prescribed limit, and inquiry respecting its author (Mr. Edwards, of Leominster) showed that he had just carried out a £3000 contract to the satisfaction of a London architect and a Government inspector. Nearly a year's delay now took place in consequence of an informality in the Board's formation which necessitated its reconstruction. The seven old members were, however, re-elected, together with fresh ones in the place of two who had resigned. The new Board at its first meeting directed the clerk to request plaintiff and Mr. Haddon (the author of one of the rejected designs), to *re-submit* their respective plans. This order, however, the clerk did not obey, but asked plaintiff simply to *send* his plans for the inspection of the Board, consisting now almost entirely of new members. Plaintiff, suspecting nothing, fell in with this apparently natural request and sent his plans. Then, without communicating in any way with him, the Board at one meeting rescinded all the resolutions relating to his appointment, and at the next decided upon insisting that Mr. Edwards should find security for the completion of the contract (though no notice of this had been given in the advertisements), and further, that he should bind himself to carry out the work for his estimate, "without any extras of any description." To the probable surprise and disappointment of the Board, Mr. Edwards agreed at once to these two fresh importations into the case. The Board then took objection at the next meeting to the sureties named by Mr. Edwards, adjourned for 3 days, and required fresh names to be supplied in the interim. By the expedient of delaying a post and ante-dating the letter, the clerk contrived to limit Mr. Edwards practically to *one* day only. Mr. Edwards was, however, absent when the letter arrived, and was therefore unable to send an answer by return of post. The adjourned meeting took place next morning, and a member named Davis was deputed to ascertain if Mr. Haddon could reduce the cost of his design by £100. Immediately upon his return, Mr. Edwards went to Presteign prepared with the names of *two* fresh sureties; the clerk, however, informed him that he was "too late," that it was needless to name these, as indeed the objection to the first was only an excuse, the Board purposing to employ Mr. Haddon instead of plaintiff. The clerk further said that the Board wished him (Mr. Edwards), to do the work, so that he had better send in an estimate for the new plans; this however he flatly declined to do, observing that he had been "fooled enough already." Two days after this, a meeting was held, at which Mr. Davies reported that Mr. Haddon would guarantee that the cost should not exceed £600, and the clerk also reported that Mr. Edwards had stated to him that he had been under a misapprehension respecting the stone, and finding now that he was expected to provide it, he should withdraw his tender. Mr. Haddon's plans were then substituted for plaintiff's, and advertisements for fresh tenders ordered to be inserted in the local papers. On seeing these, plaintiff wrote to the clerk expressing his astonishment, and demanding an explanation; receiving, however, no reply, he wrote a second letter direct to the Board, remonstrating at having been kept in ignorance of their proceedings, stating that he had fulfilled all his instructions, and that if a cheaper plan was all they wanted, they should have applied to him to reduce the cost of his design. It is not clear from the minutes whether this letter ever reached the Board, but formal notice was subsequently sent plaintiff "to state the amount of his claim." This he did, his account amounting to £50; the Board however, made a counter offer of £20 (to avoid litigation), a sum which plaintiff declined to accept. The defence amounted to this—that the contract was made conditional upon plaintiff's finding a builder to carry out his design for £700, and that he had practically failed to find such a one, inasmuch as Mr. Edwards had not fulfilled the Board's requirements as to security, and furthermore, had withdrawn his estimate in the conversation that had passed between him and the clerk. Mr. Edwards was called, however, and indignantly denied that he had either thought of or mentioned such a thing, while on the contrary he was fully prepared to carry out the work and procure the stone as the specifications described, and as he had always calculated upon. The plaintiff's counsel, in reply, argued that if even Mr. Edwards had withdrawn his tender (improbable in the extreme as it was that he would have chosen the time and circumstances alleged), plaintiff ought still to recover, because the time when that event was stated to have taken place was a year after the assurance had been given that the work could be carried out for £700, and the "conditional" element in the contract applied to plaintiff as well as to the defendants. The judge directed the jury that the points for their consideration were (1), Had plaintiff found a builder to carry out his design for the amount named? (2), Had this builder been given the opportunity of complying with the wishes of the Board respecting the security? (3), Did they believe this builder's statement that he had not withdrawn his tender. (4), Had a reasonable, or rather had *any* opportunity been afforded plaintiff for substituting another builder or reducing the cost of his design? After a few minutes' consideration the jury returned a verdict for the plaintiff, and the costs were ordered to follow the result. Since the hearing of the case, an attempt has been made to procure a new trial on the ground of "excessive damages." The judge however, without hearing the reply of plaintiff's counsel, refused to disturb the verdict of the jury. Fresh light too, has been thrown upon the motives which actuated the Board in dismissing plaintiff, by a correspondence which has recently been conducted in the local papers. It seems that Mr. Haddon, when acknowledging the return of his plans, requested that if the Board failed in getting a contractor for plantiff's plan, *his* might be put to competition; it appears also that the clerk was in Mr. Haddon's interest. These facts, therefore (stated in writing by members of the Board), combined with Mr. Haddon's assertion that plaintiff's plan would not admit of partial consecration, show that there was an undercurrent at work from the very commencement to get Mr. Haddon's plans substituted for plaintiff's.

MESSENGER V. THE GUARDIANS OF CLERKENWELL.—In this case an architect, who alleged he had been employed by a previous Board of Guardians for Clerkenwell to make plans and estimates for an infirmary, sued the present Guardians, appointed under Mr. Hardy's Act. They denied their liability partly on the ground that they did not represent their predecessors, and partly because, even if they did, there was a condition in the original contract that the plans should have the approval and assent of the Poor Law Board, who had postponed the subject. Nevertheless, the plaintiff obtained a verdict. Mr. Horace Lloyd upon these grounds now applied to the Court of Queen's Bench for a rule *nisi* to set aside the verdict. The Court granted a rule *nisi*.

Our Office Table.

A WORD TO THE WISE.—Merchants think nothing of paying £5 for one sign, with nothing but their names on it. Well! what do you think of having 5,000 signs a-week in a newspaper? In it you can show your whole establishment to the public every week. If you are wise, just go to work and advertise.—*New York Paper.*

THE OLD PRISON AT BRIXTON.—The large prison at Brixton, formerly used as a treadmill for the punishment of criminals, and subsequently converted into a prison for the confinement of female convicts, is now deserted, the last batch of female prisoners having been transferred to the new prison at Woking. The walls of the prison are being raised, and other alterations made, and when completed, it will be used as a receptacle for male convicts sentenced to long periods of imprisonment.

EXTENSIVE LANDSLIP.—An extensive landslip at Monkland Glen, a valley about 250ft. in depth, down which flows the Calder Water, is reported by the *Edinburgh Courant*. A large mass of land on the southern side of the glen slipped down, completely blocking the course of the stream, and flooding the valley for a considerable distance.

BUCKINGHAM PALACE.—A journal devoted to Poor Law matters states that Mr. Scudamore, a Guardian of S. Margaret and S. John, Westminster, proposed, at a recent meeting of the Board, to memorialise Her Majesty the Queen to place the larger portion of Buckingham Palace—the same being empty—at the service of "the deserving poor." The proposal was not seconded, and therefore fell to the ground.

DESTRUCTION OF THE OLD STAR AND GARTER HOTEL, RICHMOND.—The Old Star and Garter Hotel was totally destroyed by fire at an early hour on Wednesday morning. Only three persons were in the building at the time, and so rapidly did the flames spread after the outbreak in the basement had been discovered, that Mr. J. C. W. Lever, who had assumed the position of manager but a fortnight ago, had no time to escape, and was burnt to death. There are matters in connection with this disaster which would scarcely seem credible. When the first alarm was given, at a quarter-past one o'clock on Wednesday morning, the chief turncock of the district had to despatch his deputy on horseback a distance of five miles to the reservoir of the Southwark and Vauxhall Water Company, at Battersea, to get them to apply the necessary pressure!; and it is scarcely necessary to add that before this could be done not one brick was left upon another of what a couple of hours previously had been the Old Star and Garter. An inquiry ought at once to be instituted as to the management of the Southwark and Vauxhall Water Company, by which the Richmond district has heretofore been supplied.

ASSOCIATED ARTS' INSTITUTE.—At the usual fortnightly meeting of this Institute, held on Saturday evening last, Mr. A. B. Donaldson read a paper entitled "Art for Art's Sake." The President (Mr. R. Westmacott, R.A.) occupied the chair.

A COMMEMORATION DINNER.—A dinner was held at the Whittington Club, Arundel-street, Strand, on Saturday evening, to celebrate the completion of a mansion for Sir Dudley Coutts Marjoribanks, Bart., in Park-lane, Hyde-park. The chair was taken by Mr. Charles Long, clerk of works, and the vice-chair by Mr. Henry Luscomb, foreman of the works. After the loyal toasts were drunk, the health of Sir Dudley and Lady Coutts Majoribanks and family were proposed by the chairman, and responded to most heartily by T. H. Wyatt, Esq., the architect. Messrs. J. and C. I'Anson, builders, and several gentlemen who were present. The evening was spent very happily, and everything passed off with the greatest success.

SUPPOSED DISCOVERY OF A PAINTING BY RUBENS.—A journal of Finland states that a painting by Rubens, representing a "Descent from the Cross," has just been discovered in the church of Elenas. The inhabitants were not aware that they possessed such a treasure, although the picture had always attracted the attention of the connoisseurs. Last summer three artists, named Schestrand, Lowgreen, and Munsthelm, being on a visit to the town, declared postively that the work was a Rubens. An inquiry was then instituted, and showed that the painting had been brought from Germany in 1650 by Count de Loewenhaupt, who presented it to the town. It is said to have been restored by the artist Lindau in 1821.

DEATH OF MR. JOHN TIDD PRATT.—On Sunday night, Mr. John Tidd Pratt, for many years registrar of friendly societies, died at 29, Abingdon-street, S.W., in his 72nd year. The deceased gentleman was called to the bar at the Inner Temple in 1824, and in addition to his office as Registrar of friendly societies, held a post in the National Debt Office, and was the barrister appointed to certify the rules of savings banks. He was the author of "Laws Relating to Friendly Societies," "A Collection of the Public General Statutes," "The History of Savings Banks," "The Laws of Highways," "An Analysis of the Property Tax Act," "Suggestions for the Establishment of Friendly Societies," and other works of a similar character. In the latter years of his life he rendered efficient service to the public in disclosing, so far as official restraint would permit him, the unsound condition and business of some of the benefit, friendly, and similar societies. He also gave great assistance to the Legislature in its efforts to bring about a sounder state of things amongst such associations. He was always ready to supply anxious private inquirers with any information they desired as to the position and stability of societies in which they were interested.

THE WALLS OF CONSTANTINOPLE.—If we are to believe the latest intelligence from the Bosphorus, one more of the great subsisting relics of the grandeur of times and nations gone by is doomed to destruction. The walls of Constantinople are to be demolished, or are already in process of demolition. It seemed to present a pictorial summary of a long tract of history—five or six volumes of Gibbon at least—that grand line of double and triple rampart, with its numerous towers and gates, extending four miles, from the Golden Horn to the Propontis—the "long long walls that stretch from sea to sea," as Charles Kingsley describes them in one of his most spirited ballads. For a thousand years, from their completion under Theodosius until the capture by the Turks, they had served as a barrier between effeminate wealth within and rapacious barbarism without. For no invader had succeeded in penetrating them. The Latin conquerors arrived by sea. But they were perhaps even more dear to the lover of the picturesque than to the antiquarian. The ancient walls of Rome, venerable as they are, but irregular in outline, often sunk in deep hollows, masked with houses and with gardens so as to be generally invisible until close approach, and nowhere presenting any long and imposing front, were not to compare in point of grandeur of appearance with those of her daughter capital. Shattered with earthquakes, breached by enemies, robbed of material by encroachers, that magnificent range still remained in substance unbroken, with even its towers standing in regular succession. The broad open space, or glacis, which follows its outline—what ride in Europe can equal it?—is fringed on one side by splendid vegetation protruding from the old ditches and ruinous slopes, on the other by the cypress groves of one cemetery after another. All this monument of forgotten story will soon cease to exist. The stones, it is said, are to serve for new erections, and part of the material has been dutifully presented by the Sultan to his mother, to dispose of as she may think proper.

THE METROPOLITAN FIRE BRIGADE.—Captain Shaw, chief officer of the Metropolitan Fire Brigade, has made a report to the Metropolitan Board of Works on the London fires of 1869. The total number of calls received during the year has been 1,784. Of these, 120 were false alarms, 92 proved to be only chimney alarms, and 1,572 were calls for fires, of which 119 resulted in serious damage, and 1,373 in slight damage. The fires of 1869, compared with those of 1868, show a decrease of 96; but, compared with the average of the last ten years, there is an increase of 230. Several classified tables are appended, with details of trades, causes, and other particulars. These lists do not include trifling damages by fires which were not sufficiently important to require the attendance of firemen, neither do they include the ordinary calls of chimneys on fire. The proportions of serious to slight losses in 1869, 199 to 1,373, is decidedly favourable.

THERMO-PLASTIC PUTTY.—In a paper read before the Civil and Mechanical Engineers Society, by Mr. R. M. Bancroft, on the renewal of King's-cross station roof, it was stated the glazing putty used in this roof was that known by the above name. It is peculiarly adapted for fixing the glass in roofs of railway stations, greenhouses, and other buildings where plate-glass and iron sash bars are used. This putty hardens in a few hours after being used, but will, when exposed to solar heat, sufficient to cause expansion of the glass and metal, become plastic, and, on cooling, again returns to its original firmness, thus preventing the loss by fractures and leakage which occurs so frequently in places where the ordinary glaziers' putty is employed.

BRICKS FROM SLAG.—Mr. Joseph Woodward, Priestgate, Darlington, has taken out a patent, which may turn out to be of great importance to every iron smelting district in England. The millions of tons of slag running from the blast furnaces, and piled up in such unsightly heaps in all such districts, are to be utilised in the manufacture of the new brick. It is stated that the brick is damp-proof, that it is very solid and firm, without flaw, and pleasing to the eye. The inventor opines that it is likely at once to take the place for ornamentation at present occupied by the costly Staffordshire blue brick. Mr. Woodward's bricks can, it seems, be produced so economically, that they can be offered at less per thousand than the ordinary clay and fire bricks.

KITCHEN BOILER EXPLOSIONS.—A correspondent of the *Manchester Examiner* writes:—With a little care the danger of pipes freezing up may be avoided; but to make a close boiler absolutely safe there is no better plan than to make it, in fact, an open boiler, by coupling to it a sufficiently large pipe (say 1¼in.), which may be conducted up the chimney flue above the height of the cistern, to which it may be returned, or it may be simply turned out of doors. For myself, I should feel no security with any absolutely closed boiler, and for household purposes it is quite unnecessary that a boiler should at any time be subjected to a greater pressure than that of the column of water from the cistern. I believe I have heard that an ordinary cast-iron close boiler will withstand a pressure of between 20lb. and 30lb. to the square inch, so that when explosions do occur they may be expected to be serious.

THE ARTISANS' DWELLINGS ACT IN THE CITY.—The powers given to local authorities under this act seem to become more and more availed of. At the last meeting of the City Commissioners of Sewers, certificates were read from Dr. Letheby, in reference to the houses, Nos. 1 to 9, Three-king-court, Minories, under the Artisans' and Labourers' Dwellings Act, stating that they were in a dangerous state, and quite unfit for habitation. The surveyor also reported upon the same, and advised the demolition of the premises. It was agreed to serve the usual notices upon the owners.

METROPOLITAN STREET TRAMWAYS.—The first general meeting of the shareholders in the Metropolitan Tramways Company was held on Wednesday, at 6, Old Jewry. It was stated by the Chairman (Mr. W. Evans) that the works of the Company were being actively prosecuted. Contracts had been entered into for the supply of rails, joint-plates, and timber for sleepers, and carriages, and Mr. George Hopkins has been appointed to superintend the works.

Chips.

The members of the Royal Academy will meet on the evening of the 25th inst. to elect an Associate to their body. About eighty artists, painters, sculptors, architects, and engravers have been nominated.

Revillon, the sculptor, died recently in Paris, at the age of 50. Three of his works exist in the monuments of that city—a large statue of S. Paul at S. Sulpice, the allegorical figure of Medicine on the façade of the Hotel de Ville, and the frieze of the saloon of the Théâtre Français.

The chancel of S. Mary Magdalene Church, Taunton, has just been raised, and an elaborate reredos, by a London sculptor, has been erected, the work having been carried out by Mr. H. Davis, the builder of the tower.

The French Government has sanctioned M. Duc's gift of 40,000 francs to the Académie des Beaux-Arts, for the purpose of founding a prize for the encouragement of architectural studies.

A new bridge is to be built at Maldon, Essex, in lieu of one which is 600 years old. Mr. J. S. Cooke, of London, is the engineer.

Nearly £1,000 has been collected towards the erection of a new Episcopal church at Sheerness.

The Trustees of the British Museum have appointed Mr. William B. Rye, senior-assistant keeper of printed books, to the keepership of his department, in the place of the late Mr. Thomas Watts.

The Prince of Wales is to be invited to lay the foundation stone of a Working Men's Club, Institute, and Temperance Hall at Belfast on Easter Monday, and also to unveil the statue of the late Prince Consort at the Albert memorial in that town.

It is proposed to rebuild the Seckford almshouses at Woodbridge, Suffolk, at a cost of £1,300.

Messrs. Scrivener and Son, of Hanley, write to say that the cost of the Queen's Hotel, Hanley, (£15,000) included fittings and furniture.

The restoration of the Dutch Church in Austin-friars being nearly completed, the edifice will be reopened for service in a short time.

At the last meeting of the Pontificia Accademia d' Archæologia (Dec. 16), Cav. Prof. Betti, president, Baron Visconti, secretary, announced with appropriate expressions the loss the society had sustained in the persons of Com. Poletti and Tenerani, and the election of De Guiseppe Montanari and Padre Tongiorgi to fill their places in the Collegio dei Trenta.

The "France" states that the cost of the fêtes at the opening of the Suez Canal was 33,000,000 francs (£1,320,000).

Mr. James Sant is the new Royal Academician in succession to the late Mr. Creswick.

A Trinity steamer has taken out men and stores from Penzance for the building of a new lighthouse near Ceylon, under the superintendence of Mr. Douglas, who has lately completed the Wolf Rock Lighthouse.

A strip of land in Old-street, St. Luke's, has been purchased for £500 from the Ecclesiastical Commissioners, in order to improve that thoroughfare.

At the last meeting of the feoffees of the Taunton town lands, Mr. Houghton Spencer was appointed to the office of architect and surveyor.

A great landship has just taken place on Maesygelly Farm, near Nantmel, Radnorshire. The mass of earth which fell was of enormous proportions, and did not become stationary until it had travelled nearly half a mile, when it rested within a few yards of the Aberystwith mail road. A farmhouse narrowly escaped being buried.

Extensive premises in Fishergate, Preston, are now undergoing the necessary alterations to fit them for the purposes of a post-office and telegraph station.

The trigonometrical survey of England and Wales, on the scale of one inch to the mile, has been completed during the past week. It was commenced in the year 1791.

A new drinking fountain is to be erected in New Bridge-street, Blackfriars.

The Chartered Gas Company have been fined (at the instance of the Corporation of London) by the Lord Mayor in two penalties of £208 and £50, for supplying gas from the Curtain-road works deficient in illuminating power and of an impure character.

Mr. Cope, R.A., is delivering a series of six Professorial lectures on Painting, on Thursday evenings, at Burlington House. The Council of the Royal Academy have granted free admissions to the Exhibition of Works of the Old Masters to all the artists who contributed to the exhibition of 1869.

A spring exhibition of pictures is to be held at the Old Bond-street Gallery under the management of a new committee, which includes Mr. Ansdell, Mr. F. Barnard, and Mr. G. Chester. Sir Francis Grant has written to the committee, assuring them that "the circumstance of artists exhibiting pictures in another exhibition would in no way prejudice their interests when they desire to exhibit in the Royal Academy."

MEETINGS FOR THE ENSUING WEEK.

MONDAY.—Royal Institution of British Architects.—On the History and Restoration of Holkham Church. By James K. Colling, F.R.I.B.A.

TUESDAY.—Institution of Civil Engineers. Renewed discussion on Mr. Grantham's Paper, "On Ocean Steam Navigation. 8.

" Royal Institution. On the Architecture of the Human Body. By Professor Humphrey, M.D., F.R.S. 3.

WEDNESDAY.—Society of Arts. On the Coral and Pearl Fisheries. By P. L. Simmonds, Esq., F.S.S. 8.

THURSDAY.—Royal Institution. On the Chemistry of Vegetable Products. By Professor Odling, F.R.S. 3.

" Society of Antiquaries. 830.

" Linnean Society. 8.

FRIDAY.—Royal Institution. On Haze and Dust. By Professor Tyndall, LL.D., F.R.S., M.R.I. 9.

SATURDAY.—Associated Arts' Institute Exhibition of Sketches.—Discussion—Thesis, "That the Didactic is a proper aim in Art."

" Royal Institution.—On Meteorology. By Robert Scott, Esq., M.A. 3.

Trade News.

WAGES MOVEMENT.

THE joiners of Glasgow have resolved that on and after the 1st of March they will have a halfpenny an hour more than at present, and that they will only work nine hours a day.

TENDERS.

BEDFORD.—For the erection of a dwelling house and offices on the Cemetery-road, for Mr. W. Roff. Mr. John Usher, architect:—

Freshwater	£353

CITY.—For the construction of a new sewer in Philip-lane, City, for the City Commissioners of Sewers:—

Coker	£1017
Anderson	895
Bloomfield	864
Morris	860
Crockett	750
Mowlem and Co.	597
Crook and Sons (accepted)	587

GIPSY HILL.—For roads at Gipsy Hill. John Leaning, surveyor:—

Waterfield	£592
Spencer	589
Hancock	582
Wilson	567
Strickson	500
Emery	471
Harris	466
Morris	455
Thompson	454
Williams	446
Cole	441
Jones	418
Simpson	410
Young	403
Steeden and Cook	374
Gardner	355
Porter	355
Coker	347

ST. LEONARDS-ON-SEA.—For the erection of villa and school at Upper Maze-hill for James Elliott, Esq Mr. Thomas Elworhy, architect. Architect's estimate, £2428 :—

Nightingale, Lambeth	£2783 0
Parkes, Hastings	2780 0
Geary, Hastings	2745 0
Kenwood, St. Leonards	2728 0
Vidler, Hastings	2720 0
Jones, Hastings	2700 0
Bridgeland, St. Leonards	2678 0
Rodda, St. Leonards	2649 0
Sadler, St. Leonards	2615 0
Howell, Hastings	2625 0
Page, St. Leonards	2493 0
Hughes, St. Leonards (accepted)	2424 8

COMPETITION.

INDIA OFFICE. — A competitive examination for forty appointments in the engineer establishment of the Public Works Department in India, will be held in July. W. J. Thornton, secretary.

CONTRACTS OPEN FOR BUILDING ESTIMATES.

PEST, Feb. 7, 1870.—For the supply of slates and for covering the roofs of the city slaughterhouses. Herr Julius Hennicke, architect, Berlin, Neue Börse.

BRADFIELD WORKHOUSE, NEAR READING, Feb. 1. For the supply of good water.—J. C. Pinniger, clerk, Newbury.

ISLINGTON, Feb. 1.—For the erection of two spires at S. John's Church. Mr. A. J. C. Scoles, architect Crofton Lodge, Masbro'-road, Hammersmith.

WALTHAM HOLY CROSS BURIAL BOARD, Jan. 24. —For paving and fencing the pathway leading through the churchyard. Mr. C. Chapman, architect 51, Bishopsgate-street, Within.

ST. GILES, CAMBERWELL Jan. 17. — For repairing certain roads, also for curbing and paving the same. Geo. W. Marsden, Vestry, Clerk, Vestry Hall.

GREENOCK HARBOUR, Jan. 25.—For the construction of certain works at Garvel-park. J. K. Gray, Town Clerk, Council Chambers, Greenock.

CHATHAM DOCKYARD EXTENSION, Jan. 25.—For the supply to Chatham Dockyard of carpenters' and other tools. Director of Works Department, Admiralty, Spring Gardens-terrace, London. S.W.

ILKLEY, Jan. 17. — For the erection of a pair of houses in the Grove. Geo. Smith, architect, 3, Bermondsey, Bradford.

MIDLAND RAILWAY, Jan. 18.—For the erection of an engine shed, &c., at Manningham Station, near Bradford. James Williams, secretary, Derby.

PRESTON CORPORATION, Jan. 19.—For the erection of a covered market in Chadwick's-orchard. Robert Ascroft, Town Clerk, Town Hall, Preston.

SOUTHSEA BATHS, Jan. 24.—Contract No. 2.—For the supply of boilers, engine, pumps, pipes, &c., and for heating baths and assembly rooms at the above building. Messrs. Davis and Emanuel, architects, 2, Finsbury-circus, E.C.

WOODSETT, near Worksop, January 22.—For the erection of a vicarage house. Mr. R. Fowler, Architect, Louth.

WAR DEPARTMENT CONTRACTS, WOOLWICH, February 3.—For the erection of an additional drying room at the Herbert Hospital. Col. W. Driscoll Gossett, Royal Engineer Office, Woolwich.

BRISTOL NEW CEMETERY, January 19.—For the erection of chapels, planting, and other works, upon their land near Easton. Henry Masters, Architect and Surveyor, Park-street, Bristol.

LEEDS, January 29.—For the erection of a warehouse, shop, and house, in Boar-lane. H. E. Brown, Architect, Beulah House, Harrogate.

BEDFORD.—January 21.—For the erection of a house in the suburbs. Mr. John Norton, Architect, 25, Old Bond-street, W.

LEEDS.—January 29.—For the erection of a pair of semi-detached villas, on Headingley-hill. Thomas Ambler, Architect, 9, Park-place, Leeds.

FOR fitting up a railway arch as a place of worship. M. Sparrow, 42, Camberwell-road, S.

FRIESTON, near Boston, Jan. 22.—For the restoration of the Priory Church. Mr. R. Fowler, architect, Louth.

MAVIS ENDERBY, near Spilsby, January 22.—For the erection of a rectory house and chancel. Mr. R. Fowler, architect, Louth.

CLAXLEY, near Market Rasen, January 22.—For the restoration of Claxley Church. Mr. R. Fowler, architect, Louth.

HOLBEACH, January 22.—For the erection of a school and master's house at St. Marks. Mr. R. Fowler, architect, Louth.

MIRFIELD, January 26.—For the erection of a villa residence, premises, and boundary walling, at Mirfield. T. W. Helliwell, architect, Brighouse.

LLANGWM, near Usk, February 1.—For the erection of school-buildings, at Llangwm. John P. Seddon, Architect, 12, Park-street, Westminster.

LEEDS, January 18.—For slaters', plasterers', and plumbers' work required in the erection of two houses, Victoria-road, Headingley.

BATH STONE OF BEST QUALITY.

RANDELL, SAUNDERS, and COMPANY, LIMITED, Quarrymen and Stone Merchants, Bath. List of Prices at the Quarries and Depots; also Cost for Transit to any part of the United Kingdom, furnished on application to Bath Stone Office, Corsham, Wilts.—[ADVT.]

BANKRUPTS.

(To Surrender at Basinghall-street.)

Thomas Allen, Bromley-by-Bow, builder, Jan. 19, at 12—Wm. Bloom, Orchard-pl., Plumstead-rd. and Woolwich, carpenter, Jan. 20, at 1—Mark Bisney Bottom, Park-st., near St. Albau's, builder, Jan. 28, at 11—Frederick Waycott Daw and William Henry Daw, Blechynden-street, Bramley-rd., Kensington, builders, Jan. 19, at 2—Francis Drake, Acton, house decorator, Jan. 21, at 12—John Gardner, Cornwall-road, Nottinghill, builder, Jan. 18, at 2—George Godden, Offham, Kent, carpenter, Jan. 31, at 11—Frederick James, Lambourn-road, Clapham, builder, Jan. 20, at 2—James Robert Maley, Whiteleft-grove, Wandsworth, builder, Jan. 19, at 11—William Augustine Mathews and William Mathews, St. John's-square, Clerkenwell, engineers, Jan. 31, at 12—George Parker, Lynton-street, Bermondsey, carpenter, Jan. 19, at 1—George Reeve, Grosvenor Park, Camberwell, builder, Jan. 25, at 11—Samuel Russell, Wood Green, carpenter, Jan. 19, at 2—Alfred John Smith, Octavius-street, Deptford, bricklayer, Jan. 31, at 12—Frederick Sutton, Brownlow-st., Holborn. plumber and builder, Jan. 25, at 1—George Tooley, Walmer-crescent, Notting-hill, builder, Jan. 28, at 11.

(To Surrender in the Country.)

James Atkinson, Thirsk, builder, Jan. 17, at 12—Charles Brittain, Holylake. civil engineer, Jan. 20, at 11—Edwin Clegg, Rochdale, joiner, Jan. 18, at 11—Jos. Fairless, Newcastle-upon-Tyne, builder, Jan, 17, at 11—William Firth, Blackburn, contractor, Jan. 24, at 12—Henry Hughes, Bristol, builder and house decorator, Jan. 20, at 1—James Jameson, Bradford, Yorkshire, painter, Jan. 18, at 9·15—William Kenyon, Manchester, timber salesman, Jan. 17, at 11—William Medcalf, Mexborough, joiner, Jan 21, at 12—Hugh Middleton, Exeter, engineer, Jan. 18, at 12—James Moor, Hartlepool, joiner, Jan. 18, at 12—Peter Park, Newcastle-upon-Tyne, painter, Jan. 20, at 11—William Perks, Worcester, stonemason, Jan. 19, at 12—William John Tebby, Fritwell, builder, Jan. 17, at 12—Job Thomas, Newport, Monmouthshire, mason, Jan. 20, at 11—James Todd, South Shields, builder, Jan. 19, at 12—George Williams, Chorlton-upon-Medlock, bricklayer, Jan. 21, at 11—Thomas Wyatt, Marple, builder, Jan. 26, at 11—John Black, South Shields, builder, Jan. 24, at 12—James Leathead Curry, Newcastle-upon-Tyne, builder, Jan. 24, at 12—William Timothy French, Warwick, plumber, Jan. 21, at 11—Abraham Gittins, Birmingham, builder, Jan. 21, at 12—Charles William Marshall, Sunderland. builder, Jan. 24, at 12—Edwin Cornelius Middleton, Birmingham, architect and surveyor, Jan. 21, at 12—Jasper Thornton, Durham, builder, Jan. 24, at 11·30—Edward Tudor. Bradford, plumber and glazier, Feb. 3, at 12—Robert Wrigley, Oldham. builder, Jan. 28, at 11.

SITTINGS FOR LAST EXAMINATION.

May 6, F. M. Bennett, Malvern-crescent, Haverstock-hill, house decorator—Jan 31, R. W. Morris, Liverpool, joiner—Jan. 28, R. Lightfoot and W. Walker, Waterloo, Lancashire, joiners—Feb. 9, J. Long, Downham Market, plumber and glazier—Feb. 10, J. Pullman, Ottery St. Mary, mason—Jan. 22, J. Brightmore, Tideswell, Derbyshire, mason—Feb. 10, J. Taylor, Milgate, near Rochdale, journeyman joiner—April 29, G. E. Bryant, Gillingham, Kent, carpenter—April 29, C. Franklin, Queen-street, Edgware-road, decorator—April 29, F. Swinford, Tidemore-street, Battersea, builder—April 29, W. T. Taylor, Harrow-road, horticultural builder—April 29, J. M. Byers, Lewisham, builder—Jan. 20, C. Hobbs, Shalfleet, Isle of Wight, carpenter—Feb. 12, L. Watts, Melcombe Regis, painter.

DIVIDEND MEETINGS.

Jan. 21, J. Pepper, Liverpool, painter.

SCOTCH SEQUESTRATIONS.

David Donaldson, Perth, plumber and brassfounder, Jan. 15, at 11—George Carrick, Glasgow, builder, Jan. 18, at 12.

PARTNERSHIPS DISSOLVED.

Mullins and Co., Coleman-street, architects—Garland and Son. Leeds, builders—Jeffrey and Co., Manchester, paperhangers and plumbers—Tweddell and Carrington, Monkwearmouth, engineers—Wales and Scott, Hull, engineers—Crabtree and Co., Hebden Bridge, builders—Tomlinson and Turner, Bradford, Yorkshire, builders—Blackburn and Nicholson, Dewsbury, plumbers—Dunkley and Co., Little Ilford, Essex, and Fore-street, City, cemetery masons.

LATEST PRICES OF MATERIALS USED IN CONSTRUCTION.

TIMBER. Duty 1s. per load; Drawback, 1s.

	£ s.	£ s.
Teak ..... load	11 0	12 0
Quebec, red pine	3 15	4 15
,, yellow pine..	4 0	5 1
St. John, N.B. yellow	0 0	0 0
Quebec oak	5 10	5 17
,, birch	4 5	5 0
,, elm	4 5	5 10
Dantzic oak	4 5	6 5
,, fir	2 10	4 0
Memel fir.....	2 10	3 10
Riga	2 15	3 0
Swedish	2 6	2 10
Masts, Queb. red pine	3 10	6 0
,, yellow pine ..	4 5	6 0
Lathwood, Dant. fm.	4 0	6 0
,, St P'burg.	6 0	6 5
Deals, pr C., 12ft by 3 by 9 in. duty 2s. per load, drawback 2s.		
Quebec, white spruce	12 10	17 10
St. John, white spruce	12 0	15 0
Yellow pine, per reduced C.		
Canada, 1st quality..	18 10	19 10
2nd do.....	13 0	13 10
Archangel, yellow ..	10 10	12 10
St. Petersburg, yel...	11 0	11 15
Finland	6 5	7 10
Memel	7 0	9 0
Gothenburg, yellow	8 0	9 10
,, white ..	0 0	0 0
Gefle, yellow	9 0	10 10
Soderham	8 0	9 10
Christiania, per C., 12 ft. by 3 by 9 in. yellow	10 0	12 10
Flooring Boards, per sq. of 1in., first yel.	7 6	10 6
First white.....	7 9	9 6
Second qualities	6 0	7 0
PUMICE STONE pr tn	6 0	8 0
OILS, &c.		
Seal, pale .. per tun	41 0	0 0
Sperm body.....	86 0	87 0
Cod.....	41 0	0 0
Whale, Sth Sea, pale	40 0	0 0
Olive, Gallipoli.....	59 0	0 0
Cocoanut, Cochin, tun	43 0	43 10
Palm, fine	40 10	0 0
Linseed.....	30 0	30 5
Rapeseed, Eng. pale..	41 10	0 0
Cottonseed	29 0	36 0

METALS.

LEAD :—

		£ s.	£ s.
Pig, Foreign	per ton	18 7 6	0 0 0
,, English, W.B.	do.	19 12 6	0 0 0
,, Lead Co.	do.	19 .. 0	0 0 0
,, Other brands	do.	18 15 0	19 5 0
Sheet Milled	do.	20 0 0	0 0 0
Shot, Patent	do.	22 0 0	0 0 0
Red or minium	do.	20 10 0	0 0 0
Litharge, WB	do.	0 0 0	0 0 0
White dry	do.	26 0 0	28 0 0
,, ground in oil	do.	29 0 0	29 0 0

COPPER :—

British—cake and ingot	per ton	71 0 0	74 0 0
Best Selected.....	do.	72 0 0	76 0 0
Sheet	do.	77 0 0	79 0 0
Bottoms	do.	80 0 0	81 0 0
Australian	do.	72 0 0	74 10 0
Spanish Cake	cash	0 0 0	0 0 0
Chili Bars	,,	66 15 0	67 0 0
,, refined ingot		69 10 0	72 10 0
,, litharge, W.B.		0 0 0	0 0 0
Yel. Metal Sheathing & Rods	per lb.	0 0 6½	0 0 6¾

IRON :—

Pig in Scotland.....	cash per ton	2 16 7½	0 0 0
Bars Welsh in London	do.	7 0 0	7 2 6
,, ,, in Wales	do.	6 5 0	6 7 6
,, Staffordshire	do.	8 0 0	8 7 6
Rail, in Wales	do.	6 15 0	7 5 0
Sheets, single in London	do.	10 0 0	10 5 0
Hoops, first quality.....	do.	8 15 0	9 5 0
Nailrods	do.	8 0 0	8 10 0
Swedish Bars	do.	9 15 0	10 5 0

ZINC :—

English Sheet	per ton	24 0 0	24 10 0 25
* Devaux's V. M. Roofing Zinc	do.	0 0 0	0 0 0 *

* And 4 per cent. discount if laid upon the new system.

STEEL :—

Swedish Keg, hammered	per ton	15 0 0	15 5 0
Swedish Faggot.....	do.	0 0 0	0 0 0

TIN :—

Banca	per ton	110 0 0	110 10 0
Straits, fine.....	cash	110 0 0	111 0 0
,, for arrival		0 0 0	0 0 0
English blocks		116 0 0	117 0 0
,, bars.....		117 0 0	118 0 0
,, refined, in blocks		118 0 0	0 0 0

REGULUS OF ANTIMONY :—

French.....	per ton	0 0 0	0 0 0

SPELTER :—

On the spot.....	per ton	19 10 0	19 12 6
QUICKSILVER.....	per btl.	6 17 0	6 18 0

UNDER THE PATRONAGE OF H.M. THE QUEEN.

THE LONDON PARQUETRY WORKS.

the first Manufactory established in England (in 1841) by CHARLES STEINITZ, founder of the English Parquetry Business, for the exclusive production of

"Solid and Plated" Parquet Floors, Borders, Ceilings and Wall Decoration.

In Geometrical, Curvilinear, and Mosaic patterns.

Plans and Estimates, for First-class Work only, prepared free of expense. Manufactory—Camberwell Hall, Grove-lane, Camberwell, S.E. Sole Agents and Show Room, Gillow and Co., 176 and 177, Oxford-street, W.

Messrs. Charles Devaux and COMPANY, Bankers and Consignees of the VIEILLE MONTAGNE ZINC MINING COMPANY, supply the VIEILLE MONTAGNE ROOFING ZINC, and allow a discount of 4 per cent. wherever the roofs are certified by the Company's architect to be properly laid.—Particulars or designs will be supplied at the Vieille Montagne Company's expense, by their architect, Mr. JAMES EDMESTON, of 5, Crown-court, Old Broad-street, E.C., where models of the various patents for zinc roofing may be seen.

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GENUINE AND ARTISTIC

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TRADE MARK.

J. J. CORDES & CO., the Patentees and Manufacturers of the well-known

PATENT WROUGHT NAILS

(Commonly called EWBANK'S NAILS),

Desire to make it known that they have adopted a "star," or "cross," as their Trade Mark, and that all Nails now made and sent out by them, except Clasp, bear this mark upon their heads, and that within every package sent from their works is also placed a card bearing their name and address. All their bags are also branded CORDES and Co.

The Nails are manufactured by J. J. CORDES and Co. out of Scrap and the best kinds of Pig Iron, and have long since earned the reputation of being superior to all others. The Nails are all uniform in make and quality, each one perfect and count out full 1,000 to the M.

DOS WORKS, NEWPORT, MON.

THE BUILDING NEWS.

LONDON, FRIDAY, JANUARY 21, 1870.

ARCHITECTURE IN MANCHESTER.

MANCHESTER is just now, unfortunately, taking its share of the commercial depression so general in the metropolis and other populous districts. Building operations, notwithstanding, seem by no means in such a state of suspense as the hard times, severely felt here by the labouring and the middle classes, would lead a stranger to expect. Two very large works—the new Exchange and the new Town Hall—are progressing, and if but slowly, it is hardly surprising, when one reads nearly every day in the local newspapers the discouraging advertisement—"Wanted, Masons to keep away from Manchester during the continuance of the Strike." "Masons," however, do not altogether "keep away."

"Art architecture," in this city, academically regarded, would seem to be in a truly stagnant condition. The Annual Exhibition of Works of Modern Artists, just closed, contained not one solitary contribution by an architect. The sculptors contributed only twelve works, the rest of the exhibition being made up of paintings in oil and water-colours. And yet of the Manchester Academy of Fine Arts, housed within the building (the Royal Institution), nearly one-fourth of the members are local architects. The Heywood gold medal, with a money prize, seems to have been offered frequently since 1842 for the competitive works of architectural students without eliciting very much of their energy, judging from the fact of its having been only twice carried off, and that by a solitary architect, Mr. R. Popplewell Pullan. Of late years it would seem to have been altogether withdrawn from architectural competition, and no wonder.

The New Assize Courts are so well known to the public by means of published views, that any very long description of them is unnecessary. They are now completed, and the visitor cannot fail to be agreeably impressed by the exterior of this stately building, certainly a great improvement on the architect's competition design engraved some ten years ago in THE BUILDING NEWS. "Carving," says a modern writer, "is the refuge of the incompetent architect." In this case, however, it is the very reverse, the architecture being far in advance of the carving. The statues, all of them too short, and generally too diminutive for their niches, are crude and undignified. Their proportions might very possibly have been correct enough in the carver's *atelier*, but seen from the street their general forms are in *anamorphosis*, and their protruding features overlap one another. This is unfortunate, as the edifice itself is remarkably beautiful, evincing both in its general features and detail great taste and versatility, combined with careful study on the part of the architect. These qualities are manifested everywhere about the building, and notably in its terrace wall, metal fence, and pier terminals. Internally there is much to admire. Both the Nisi Prius and the Crown Courts are (if we may except the position of the witnesses in the former) admirably designed; both courts are well adapted for hearing in, and of vigorous though subdued architectural detail. The entrance-hall is somewhat dark for its purpose, and is marred by the large windows at each end, whose general design struck us as altogether too Anglican for the remainder of the edifice. These windows are not improved by the painted glass they contain. At the Crown Court end is a beautiful sitting statue of a well-known stipendiary magistrate, deceased. Executed in white marble, it looks out of place in this sombre hall of polyehrome, and anywhere would be far better divested of the barrister's wig, seldom seen on the head of the late estimable John Frederick Foster.

Hard by the Assize Courts is the Woolsack Tavern, a recently-erected Gothic building, whose design displays much skill in the treatment of its brickwork details.

At the rear of the Assize courts stands the new prison, lately built under Mr. Waterhouse's direction. It is a vast structure of red brick and stone, of Romanesque character, and of the usual radiating plan, offering so very few facilities for architectural treatment. Some critics assume that the aspect of a prison should be necessarily gloomy. Without going that length ourselves, we confess there is a very pronounced air of sprightliness about this edifice that might at least scandalise a Middlesex magistrate accustomed to—let us say, the Clerkenwell House of Detention. There is much skill shown in the external design of this Manchester prison, but the termination of the lofty foul-air shaft by an octangular dome and funnel pipe is hardly so successful as, for example, that of the ends of the prison wings, and the design of the boundary wall. Altogether, it is a very fine structure, and highly picturesque, as one looks down upon it from the high grounds of Cheetham, the *entourage* of which is gloomy enough in all conscience.

Little can be said of the new Royal Exchange, or of that other vast municipal work, the New Town Hall. The latter is, as yet—like the early Christians—in the catacombs; and its immense hoard is all one can see of it. As to the Royal Exchange, in the absence of published views of it, one can only guess what it is to be by the fragment in progress of the south side of the present Exchange. The besetting sin of this structure, a re-facing of an older one, by Harrison, of Chester, is its monotonous flatness or want of relief. Now, nothing can well be flatter than a pilastrade, relieved here and there with oblong panels, but at present this forms the staple of the new edifice, as seen above the lofty hoard along Cross-street. Certainly, anything will be better than Newall's-buildings, which formerly stood here. Let us hope that the New Exchange will be "a horse (or a Bourse) of quite another colour."

Of municipal buildings completed, the Hulme Town Hall in the Stretford-road is well worth a visit. It is a handsome edifice of Italian character, with an external façade of considerable extent or frontage, wholly executed in warm-coloured ashlar. In the central pavilion is the Town-hall proper, having a massive and well-designed doorway in the centre of a bold rustic basement, surmounted with a lofty attached colonnade of the Corinthian order, the entablature freely and cleverly treated. Within the intercolumniation (somewhat eccentric and ungainly) are the windows of the great hall, which measures some 95ft. by 45ft., and some 40ft. in height. These, though of bold design and height, being the only features within the order, rise considerably short of the architrave, or rather of the continuous astragal, enclosing a line of sculpture, so that there is in the space between it and the window-heads plenty of plain ashlar; a prosaic feature, truly, but here in this façade "worth a king's ransom." To the left of this central mass, or pavilion, is the Hulme Vestry-hall, and to the right is the Hulme Free Library, each of lower height, and of subdued, but consistent, design. These have their respective entrance doorways in the centre; and good, bold, effective doorways they are. The interior of the building is disappointing: the details, utterly unlike those outside, being quite rococco and meritricious. "Comparisons," quoth Mrs. Malaprop, "are odorous;" but, having now ventured on this comparison between the outside and the inside of the Hulme Town Hall, it may not be amiss to make another. It is impossible to look at this suburban *hôtel de ville* of a merely provincial city, and think of buildings of its kind around the metropolis, without wishing that the vestrymen of S. Pancras, of Kensington, Clerkenwell, &c., could see and take a hint from this parochial building in Hulme. We had an opportunity of testing the acoustic qualities of the large hall, and can pronounce them excellent.

At Pendleton, another suburb of Manchester, the visitor will find another handsome Town Hall, of which some very fine photographs were to be seen in last year's Architectural Exhibition. At present we merely allude to it as an evidence of the public spirit of the Manchester people.

Mr. Worthington's Albert Memorial is unquestionably the finest of the (completed) works of the kind; and in its details it is worked out with marvellous richness, refinement, and delicacy. Unfortunately, there is too much of this last quality; and, for so small a shrine, they have a finicking air. The general form of the shrine or pyramidal canopy is not pleasing; and why the upper part should be so plain does not appear. The carved figures in the already diminutive niches are even too dwarfish for their receptacles, and should, we think, stand further forward; all which is very unfortunate in a work of otherwise great merit. The marble statue of the Prince is, like nearly all the statues in the City, excellent; but we were surprised to see it placed with its face *towards* the intended front of the Town-hall. Perhaps the Corporation had in their head the poet's (Swift?) jocular lines on the statue of Queen Anne, turning her back to the West front of St. Paul's Cathedral, and bestowing her attention to the (then) spirit-shop over the way. Surely this statue in Manchester ought to have been placed with *its back* to the Town Hall.

The new churches belonging to the Establishment are numerous; but few of them large or costly. The new tower of the Cathedral has been some time completed, and ought to have been a work of some pretension, for if there is any style of Gothic art which a modern English architect might be expected to be fully equal to, it is that of "detestable Perpendicular," as Mr. Ruskin calls it. The new tower is not only very inferior to the old one, of which it is a *quasi* copy, but its details are not even equal to those of the latest restorations at the choir end of the church. Its "west" doorway is singularly insipid, and the buttresses, with their empty niches, are bald and meagre. The whole tower has a cheap, starved look, as though the Chapter authorities had pared down the architect's scheme to the smallest limit.

The best view of the cathedral is to be had from an almost recently built bridge ("Salford Bridge") connecting the end of the high street of Salford with Hunt's Bank. While standing on it one could not but be most struck with the excessive vibration to which every passing waggon or loaded cart subjected this structure—an iron one with a very massive parapet of real or sham masonry. It is an ugly make-shift of a bridge in the midst of a large city; but the levels of the approaches are not very favourable to architectural display.

S. Luke's, Chorlton-on-Medlock, is a new church of stone, which has replaced the old unsightly brick building with a "bell-cony," that originally occupied a good site at the junction of Bedford and Rutland-streets. The new edifice, designed in the Geometric period of Gothic architecture consists of nave and chancel with north aisle all under span roofs, the aisle terminating in a well-proportioned and graceful tower and spire. The details are satisfactory and the general grouping effective. The building would have been far better but for the overdue prominence given to its horizontal dressings, for a more simple and massive dwarf wall, with which the high gateway in Rutland-street is scarcely consistent, and for a less evident indisposition to let well alone, that crops out in sundry trifling sinkings and fillings up of plain masonry, as in buttress, canopies, &c. The stair

turret at the western end of the church is, with the metal vanes, stone finials, &c., unusually good. Very many of the churches lately built about Manchester are the work of Messrs. Medland and Henry Taylor. They are inexpensive works, constructed principally of the red "seconds" brick of the locality, relieved with bands, &c., of black ones, and all of them manifest great inventive power and much study on the part of their architects. S. Stephen's Church, in the City-road, is one of their latest works, and one in many respects greatly inferior to some of their earlier ones of the same class. The general arrangement is, like that of all their churches, ingenious and picturesque ; and seen from the high road on which its chancel gable abuts, the edifice with its lofty double-aisled chancel, nave with gabled aisles and *flèche* (somewhat too diminutive) presents a striking group, to whose *coup d'œil* the adjoining schools and residences, by the same architects, well contribute. The details are by no means equal to the general design, owing to an evident over anxiety to make more of the homely materials than they are, judging by this sample, capable of—moreover there are in this structure violations of architectural synthesis quite startling. Here may be seen in the same windows ogival tracery of well-nigh Flamboyant freedom inserted cheek by jowl with Geometric lines—one can scarce call it "tracery"—of the most crude and rigid character. Gouty red brick mullions display central fillets, double the width of those of the stone tracery they bear, but won't consort with, particularly when it assumes the flowing form, as it does notably in the aisle windows. The doorways are well and simply designed, but in many of the details, such as the gable crosses, the projecting brick panelling, and even the nave ridge tiles, there is a painful hankering after originality, that often falls short of its aim, and ends in oddity, or even worse.

Within little more than a stone's throw of S. Stephen's are two other churches by the same architects. S. Gabriel's, in Erskine-street, and S. Michael's, in Lavender-street, Hulme, each of them quite as original as S. Stephen's, and immeasurably superior to it. S. Gabriel's is a cross church with semi-circular apsidal chancel, and chancel aisles abutting on the street, and will doubtless, when its transeptal tower is carried up, be a very effective edifice. S. Michael's, with an admirably designed exterior, has fortunately been built *with* its steeple, a square tower rising from the west end of the south aisle, and crowned with a pyramidal roof. At the base of the tower is the south or principal entrance to the church, through a doorway of excellent detail and proportion, the door head embellished with a well-carved figure of our Lord in Glory. This church has a lofty nave and chancel, the former lighted with a gabled clerestory and simply designed aisles, and the latter flanked with transeptal aisles or side chapels extending to the easternmost wall of the building—the ensemble highly picturesque, and the details and general proportions so simple and so well studied that one wonders how S. Michael's and S. Stephen's churches in Hulme can have been designed by the same architects. To our mind S. Michael's exterior displays the very *beau idéal* of a brick church for a town district.

One of the largest ecclesiastical buildings now constructing here is the church of the Jesuits in Oxford-street. It will be a very lofty edifice of stone of Geometric Gothic architecture with several lateral chapels. The church is being built from the designs of Mr. Joseph Hansom, and at present not much can be seen of it. The mouldings, &c., seem somewhat over-delicate, and look at present as though they would be drowned or absorbed in the large surfaces of rough York "parpoint" walling, in which they are set. The site is a very favourable one ; and indeed this may be said of most of the public buildings lately erected in Manchester.

The Irvingite or Catholic Apostolic Church, erected some thirty years ago in the Stretford-road, has disappeared, and in its stead a lofty church has been built, with nave, narrow nave, aisles, and chancel, occupying the entire original frontage. The interior is simple and effective, as is usual in the case of churches whose sole sidelight is from a clerestory. The external details are not so good, but coarse and ungainly. The first built diminutive edifice was, we believe, the work of an amateur, and, considering the period of its erection, singularly pure in detail.

The Wesleyan Methodists of Longsight have vacated their place of worship (built there only about nine years ago), and in its stead have erected in its neighbourhood a very handsome stone church, with a lofty tower and spire. The style is Geometrical Pointed ; what the interior may be we cannot say ; but of the interior there can be but one opinion. Its general design is remarkably good, and the details, carving, dwarf iron fence, &c., are all excellent. At Levenshulme the Wesleyan Methodists have erected another stone church with tower and spire—a building of much less pretension and cost than the one at Longsight ; and, moreover, of coarser detail. Still, the general outline of the exterior is pleasing and well proportioned, far more than can be said of Levenshulme Church on the opposite side of the highway. Such an amorphous, hog-backed abortion as this edifice one does not often behold.

Here, for the present, our remarks on the recent architectural doings in Manchester must be brought to a close. There are still other buildings of every kind to notice ; and as yet we have said nothing of the private works in and about the city, including that remarkable class, the warehouses of Manchester. They and some other structures must be left for another article. W. Y.

LONDON AND ITS ORNAMENTATION IN 1870.

AN enumeration of the buildings erected in 1869 is not a difficult task, and when we have completed it we may make the usual remarks as to style, and arrive at the judgment that no revolution in that sense took place last year. There was the usual distribution of Classicalism, Mediævalism, and Italianism. There will of course be a tendency, not capable of present estimation, to a predominance of one style over another, but it takes long to ascertain whether such an effect is temporary or permanent. It may, however, be worth while to inquire, so far as the metropolis is concerned, what is the influence likely to be made on the public mind of the inhabitants of the metropolis by the labours of the year, not only of those which are strictly architectural, but of those which come under the proper province of the architect, as the minister of the Ædile of London, if we, as yet, have got one ?

First, as to the Thames Embankment, by no means a building in the ordinary sense, the impression is one of general satisfaction, arising from the extent of the construction, the durability of the material, and the solidity of the works. The Embankment has been by no means regarded in reference to its artistic effect by the general public, nor can it be said to have been professedly criticised in that respect. There is also the consideration, affecting many critics and the public at large, that the promenade portion is not finished, and there is a supposition that it may have some considerable share in the general appearance, as also that the statuary and lampwork are not yet fixed.

It is possible that when all this is accomplished, there may be some comment as to the design of the Embankment. This, however, is not certain, because the fixed features of the Embankment which will not be improved have escaped notice. Thus, there is no proper or harmonious treatment of the permanent buildings on the Embankment—Somerset House, the Temple, Lambeth Palace, and S. Thomas's Hospital. The Embankment is made to mar the whole of these needlessly, and the injury to Somerset House is great and unjustifiable. The multiplication of the lion's heads, or knockers, is also a reflection on our artistic capacity, but there is the hope of their removal. The mouldings of the Embankment entail a needless waste of money, a portion of which could have been well applied to artistic purposes.

In making these remarks, which might be carried further, and into more detail, there is this to be said as to the Embankment, that it may produce what it used to be the fashion to call a great æsthetic effect. It may accustom us to ideas and impressions of symmetry, which have not heretofore been realised, and for which it is deeply to be regretted the Embankment does not furnish a perfect example. The long sweep of these quays, carried out persistently knocker by knocker, will prepare the public eye for extended compositions, of which we have few examples in London. The Custom House is not happy, nor can we quote dock warehouses, but Greenwich Hospital and S. Thomas's Hospital furnish us with our largest façades. Apparently the Palace of Westminster is here excepted, but it has been so unhappily dwarfed by the terrible alterations that it seldom shows its full power.

S. Thomas's Hospital, by offering a line parallel to the Palace will, to some degree, enhance the Palace, for, with the Bridge, a fine quarter is formed, as seen from the river on the west. It is, however, to be regretted, that the Hospital was not so composed as to group better with the Palace, and the Bridge, and so unite them with Lambeth Palace, and the Embankment should have been arranged accordingly. This observation will show how it is that having failed in such an opportunity the Embankment may help us in suggesting the possibility of lines of palazzi, such as our river could well exhibit. We must not, however, lose sight of this, that we had one lesson forty years ago, which has been to a great degree lost upon us, and that is the lines of terraces in the Regent's-park, designed by Nash and Decimus Burton. The aspiration was a good one. It was to give us palazzi in that park which might have rivalled the world. The unhappy infatuation that stucco and Roman cement were better than stone and marble has, however, deprived us of the realisation. These fronts, with all the regulation whitewashing and colouring, have become dingy, and the statuary dilapidated ; while stone, at any rate would have borne age and poverty with some dignity, and might have put forth claims to veneration.

The Regent's-park and Regent-street examples have indeed given us long lines of Belgravian and Tyburnian streets, but though stone is now more freely employed, it is rare that we obtain the results we should desire.

In connexion with the Embankment, Blackfriars Bridge naturally suggests itself. Its polished granite shafts have been favourably received, and so has that portion of the gilding already finished. This will be one of the lessons of the day, for we have never had a mass of gilding so displayed. It will emulate anything there is in Paris, and already far surpasses what Mr. Page has done on his bridges to the west. From the bridge will be seen to arise from several points of view the golden gallery and the gleaming ball and cross of S. Paul's. The old stone bridge made a good base, above which rose the upper story of the body of S. Paul's and the dome and campaniles. The iron bridge, undecorated, would rather have balanced the dingy dome and depressed the aspect of the whole monument. This detriment the gilding of the bridge relieves us from. It may be the engineer never contemplated this, but we may thank him for it. The completion of

the bridge will, however, suggest one plan, and that is calculated to afflict many with horror—the gilding of the ribs of the dome.

To state that any one had hinted the possibility of gilding the dome of S. Paul's, would but a few years ago have made some worthy purists run mad. It was thought a bold idea to gild the spikes of the Museum railings, yet from that we have got to gilding bridges, and we are not quite distracted. To gild the dome of S. Paul's would not require such a very large subscription, and its effects in those grand views of London seen from Hampstead, Greenwich, the Southern hills, and so many other points, would far transcend that of the glittering ball and cross.

The accidental effect of Blackfriars Bridge and St. Paul's for good, and the accidental effect of the Embankment and Somerset House for evil, are worth noticing, because London has such a variety of surface, not omitting the rise and fall of tide on the river, that any building in a conspicuous situation near the Thames must have its operation on the general view. We most of us get so palled by constant seeing, that we are apt to forget London is in the eyes of tourists one of the most remarkable sights in the world ; one which might be enhanced by judicious care, as too often it is under present circumstances marred. It is supposed the daily passer in St. Paul's Churchyard does not see St. Paul's, and the old Londoner who has thus passed twenty thousand times has but a dim appreciation of it. He must see it from some distant hill at sundown, or from a bridge by moonlight, and then he thinks something of it.

In some things we cannot rival Paris, but we have yet a chance for taking advantage of some of our points, and now that Baron Haussman is deposed, a few years may put us well ahead. The general tendency of late operations in the ornamentation of London is certainly in this direction, small and practical as they may be. The features that we have already mentioned will decidedly influence the public mind. The day and night decorations of Palace-yard are efforts in the same direction. The gardening has been successful in the public eye. Formerly, in many parts of the metropolis and of the City, we had trees in nooks, but we had no flowers, and the squares were dismal. Now these new plots of grass and flowers not only gladden the eye, but they do much more—they directly train it. In fact, much of the matter of our observations really refers to the cultivation of the public taste, and we are coming to the point where not only is the necessity felt, but the means are provided for supplying the want, though as yet partially.

There are some old architects still alive, who have not abandoned the orthodox faith of their pupilage, that architecture is a select art for the select few, and that though the public may and ought to pay for it, yet it is only the *cognoscenti* who can enjoy a good thing. The efforts of such men were little calculated to raise the public taste. Some of their choice works are yet to be seen. A chaste brick house in St. James's-square, reaching the height of art in simple elegance, by means of the elaborate expedient of a Palladian portico and rusticated quoins. There were, too, men of rare genius, who relieved the plain brick by masques on the keystones of the windows. Such were bold effects, seldom attempted but by the most daring. The public might well doubt whether architecture was a fine art, whether there was any difference between an architect and a builder, and whether tweedledum and tweedledee presented any appreciable grounds for real distinction?

To get from such a state as this to real designs, in which a positive ornamental and artistic effect was attempted, and often achieved, was a great progress, because ideas of the sublime and beautiful were proposed, but such alone could not impress the population, which had been deprived of its proper instruction in art. The rise in favour of the mediæval styles, with the greater attention to artistic detail, has enabled architects to render a real service to public culture. The eyes were attracted by colour, and minute features of form, and if grotesqueness and sham antiquarianism disfigured many of these attempts, still there were materials to attract public attention.

It is now that architecture, with its accessories, has reached this stage, that it comes in appropriately to aid the great movement for industrial training. Abstract art, the art of *cognoscenti* and *dilettanti*, is not enough, but there must be something tangible, which the tradesman and artisan can appreciate. The public eye must be cultivated, not by picture galleries alone, which can only be rarely visited, but by those open exhibitions daily coming under our gaze in our daily passage through the city. For such purpose the garden plots referred to are particularly useful, because they display arrangements of colour and form which all can understand. The variations of these compositions, as new plants are brought forward are further favourable, because there is not the constant repetition which tends to deaden attention.

The care which has been bestowed on the lamps and their grouping by day and night in the Westminster Palace district is also worthy of notice, as being not only ornamental, but serviceable to the public in the manner pointed out.

HYDE CLARKE.

A NEW FACE IN AN OLD PLACE.

UPON the site of what is said to have been formerly the residence of the notorious Judge Jefferies, facing St. James's Park, halfway between the Foreign Office and Birdcage-walk, there has lately been erected a small but fanciful structure for the purpose of a private residence, which is in many respects sufficiently remarkable to induce us to call especial attention to it, and particularly to some of its features, which are calculated to give rise to profitable reflection. As the tenor of our comments cannot upon the whole be complimentary, we forbear to particularise the authorship, further than by saying that we are informed both the owner and his architect are from the provinces. Their importation, as a contribution to the architectural curiosities of London, would appear to argue that they have had more money than wit at their command, and at any rate have no reason to complain if we criticise their work with less reticence than we consider it right to concede, when praiseworthy efforts have been evidently crippled by paucity of means. But when butter is spread upon bacon no plea of economy is admissible as an excuse for the indifferent character of either. We would, however, premise what we have to say by gracefully acknowledging, as we think is but due, the spirit of sacrifice with which this work has been carried out. The public—we beg Mr. Dickens's pardon—The Public we should say—unless the gorgeous array of this villa is specially intended for the gratification of the occupants of the Circumlocution Office close by, or in rivalry of Mr. Scott's work of the same class in which they are housed, have been well catered for. A little more experience in building in London would, we think, have tended to a soberer, or else a more pronounced style of polychromy, for the delicate hues indulged in will last but a short time. This, however, we will let pass, and consider the result in its present state, while it conveys fairly the ideas of its designer.

The building is a quadrangular block, with a circular tower projecting from one angle, with an excrescence on the top, like the handle on the lid of a pomatum pot. The whole appears to be an addition to one of the houses in Duke-street, and has evidently been constructed under some difficulties, so as not to interfere with the windows of the upper portion of the main house, to which it is attached, or in front of which it stands. The block has two stories above the basement, the tower being carried up two stories higher still.

Now the first impression forced upon us, is surprise at the extraordinary direction into which the efforts of enterprising practitioners in the Modern Italian style are driven. They seem in no degree to recognise any duty to make utility the base of their ornamental features, but follow any caprice which may happen to strike them ; at any rate, the why and the wherefore of the numerous vagaries this building presents have effectually escaped our powers of detection.

In the Doge's Palace, on the side next the Canal, which passes under the Bridge of Sighs, the lower story is emphasised by the blocks of stone being cut with facets, ending in a projecting point, with the view of giving a look of unusual solidity, a feature which might not inaptly be imitated for a fortress or prison. Here, however, it has been reserved as a species of decoration for the topmost story, crowning one of polished ashlar below. The same disregard of propriety of scale and of common sense is also shown in the use of a Brobdingnagian belt of egg and tongue moulding, which, with nothing to support, encircles the tower immediately above, and throughout there is a want of harmony between details in juxtaposition, some being delicate to effeminacy, and others bold to coarseness.

The fenestration is a wonderful feature. The windows of the principal stories are wide windows of the sort ordinarily called Venetian, composed of a central wide opening, with narrow side ones, the former carried down to the floor, and the latter with their sills 3ft. higher. The entire opening is spanned by a wide stone lintel, treated as architrave frieze and cornice. This, obviously too weak for its work, is supported by two slender iron columns, which of course look like afterthoughts. The whole composition is so crowded into the bay of the order of the façade that its cornice actually touches the soffit of the architrave of the latter.

But the polychromy, as the most novel, and evidently the most studied feature of the building, calls for some remark ; the usual idea that colour should be used to emphasise form has been ignored throughout. The principal entablature of the structure has its cornice supported by corbels, which divide the frieze into a series of square panels, each having a yellow patera with a white centre on a dark ground. This is good, but the corbels between, which as projecting should be light, are, as if from perversity, made of black marble, and thus the whole effect is spoilt.

The friezes of the windows are filled with tiles of a crude grass green, with dark Greek honeysuckle ornament, and some other details are enriched with colour in a manner which does not at all shake our opinion, before expressed in this journal, that the mixture of stone with marbles and ceramic coloured decorations do not harmonise, and we think this will become painfully evident when the former has got smoke-begrimed, as it must, in the course of a few months.

Red Mansfield stone has been used in parts as a contrast to the white stone, and as the texture of their two materials are similar, the same objection does not apply to their combination ; only in our opinion, the red stone, as the darker, should be used for the ground and the other for the architectural features, which should stand out therefrom. Thus in a column one would think the shafts should be of the deeper tint and the capital base and zone of the lighter. Here, however, just the opposite treatment has been used for the capital and zone, the base and shaft being of the pale stone, producing a most comical and unpleasant appearance. Delicate inlays of a bizarre character of design are freely introduced, and these seem out of place in connection with some of the other ornamentation of pure Greek character.

To conclude our remarks, which we really

regret to have been obliged to make less appreciative than we should have wished, considering the liberality of both the proprietor and designer of a structure that has been evidently intended to be *bijou*, we would commend architectural students to visit it, for they will certainly find in it food for thought, but, at the same time, to view it with discrimination, lest while their appetite for novelties be indulged, their digestion be impaired by the unquestionably unwholesome ingredients contained in the dish thus provided for them.

THE BULGING OF WALLS.—CAUSE AND PREVENTION.

THE ugly protruding curvature commonly called a bulge, to which external and front walls seem especially subject, may frequently be traced to original defects of construction. Bulges very often occur at about the level of a floor, and where there is a floor, the brickwork of outer walls is commonly weakest. To avoid running the floor-timbers into party walls, they are generally made to rest on the front and back, and the party-wall will often appear in better condition than the front. Immediately below the level of the intended floor, a timber scantling about 4½in. by 3in. is laid along the wall flush with its inner face, to receive the ends of the joists. The joists, let it be assumed, are about ten inches deep, notched to nine inches at the ends, so as to rise the height of three courses of brickwork. Here, then, bond-timber and joists together make a height of 12in., or four courses of brickwork. The joists will have a bearing of 6in. on the wall, and the wall may be supposed to be a brick and a half thick. Now wherever the joists occur, there is a complete interruption of the bond on the inner side of the work, while externally it appears unbroken, the outer face, in fact, being carried up half a brick in thickness, and looking as though the whole wall were perfectly solid and uniform; but the backing between the timbers too often consists of bats and small pieces put together in a mysterious though incongruous way. So long as the timber remains sound and of its full dimensions, all is well, but this is seldom very long. The manner of converting balk timber into scantlings precludes the permanent retention of its original form. When felled and squared in its native forests, it is thrown into the first lake or river, formed into rafts, and navigated to some port of shipment, where it is formed into cargoes for conveyance across the ocean. The sea voyage over, it may be assumed to the port of London, the timber is again immersed in the water, which usually constitutes its only place of storage till wanted for actual application to some building. As to deals, an architect may specify dryness as a necessary quality, but he must not expect it in timber. He may say that it shall be sound and well seasoned, but water-seasoning is all that takes place previous to conversion, and this fact is noteworthy, because as the subsequent shrinkage may be estimated at three-quarters of an inch in the foot, it becomes obvious that so far as the bond timber and joists are to be regarded as forming the inner material of the wall, a subsidence equal to the shrinkage must take place. But the wall does not depend on the woodwork alone, and the irregular filling up between the joists will receive the weight, and so the evil will be deferred. For the time there may be no other visible result than the dropping of the floor from the skirting, and when the latter is of wood, the simultaneous rising of the skirting from the floor. It is when the wooden bond, having shrunk to the minimum dimension of perfect dryness, enters upon its course of decay that the worst consequences of inserting timber constructionally in walls are developed. The inner face then sinks, and the statical conditions are disturbed, and bulging is inevitable. It was a custom of bygone days to insert timber very freely in walls. Foundations were fortified, as it was thought, by the introduction of a "chain-bond" of large scantling, and many a goodly edifice has suffered from the practice. Great therefore, have been the improvements adopted in the modern construction of walls. A solid basis is obtained by the use of concrete; wrought iron hooping has advantageously displaced wooden bond, and the joists are kept as much as possible out of the walls, their ends being supported by brick or iron corbels. Thus all rapidly perishable matters are excluded, and a lasting character imparted to work so executed. Skirtings also are made of stucco instead of wood, and shrinkage in that quarter got rid of. Thus experience and science are gradually removing one of the old defects and disfigurements of buildings—the bulging of walls.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE first ordinary general meeting since the Christmas recess was held on Monday evening last, Mr. I'Anson, Vice-President, in the chair. Messrs. P. B. Alley, jun.; W. Haustock, and Josesph Hewett were elected Associates.

Mr. SEDDON, Hon. Sec., read a letter from Sir Sydney Smirke, with respect to the placing of architectural drawings in the annual exhibition of the Royal Academy. The Academy, the letter stated, still recognised the south-east gallery as destined for architecture, but in the event of the drawings submitted not being of sufficient merit, the Committee reserved to themselves the right of filling up the vacant space by works cognate to architecture.

Professor KERR said that it was a question whether architecture was to be elbowed out of the Academy or not. If not, the Institute ought to take a decided stand, and insist upon having the fair share of space at the Academy which it had held since the foundation.

Mr. SEDDON next announced that a special general meeting would be held on February 7, to take into consideration certain business matters. At this meeting, Sir Sydney Smirke's letter will be further discussed.

Mr. JAMES K. COLLING then read a paper on the "History and Restoration of Holkham Church, Norfolk." As the salient points of the paper have already appeared in THE BUILDING NEWS (page 8, July 2, 1869; and page 460, Dec. 17), and as the new reading desk formed the subject of one of our illustrations on the first-named date, we have only to add that the paper was illustrated by a very large and beautiful collection of drawings, and that Mr. Colling was highly complimented for his designs of the carved woodwork, screens, &c.

Mr. SEDDON next read a letter descriptive of Roberts's fir timber. The letter quoted some testimonies favourable to the material, which has been used by Mr. Talbert for furniture. Specimens were also exhibited.

The Chairman announced that the next meeting will be held on the 31st instant, when a paper will be read by Mr. W. D. Crace, "On the Ornamental Features of Arab Architecture."

SANITARY PROGRESS.

ONCE enunciate a truth, and slowly and gradually it takes root. This is more particularly the case if the application of the truth is found to be of immediate interest. Though so much has been said on the sewage question, and, in the estimation of many, so comparatively little done, still it is obvious that palpable progress is being made. This is shown in an article in the last number of the *Mechanics' Magazine*, which says that one of the great errors fallen into by farmers is that because they understand the usual and ancient fashion of tilling and cultivating land, they are therefore quite competent to apply sewage to it with success. The sooner agriculturists understand the folly of such an assumption the better. They make a great and radical mistake in imagining that there is nothing else to do but to turn the sewage on to the land. It is the indulgence of this woeful error that has led many an unsuccessful farmer to disbelieve in the principle of sewage irrigation. Sewage cannot be applied indiscriminately to land, whether we regard the soil, the crops, the quantity, or the periods of application. Each one of these points must be carefully studied, and it is not until they have been thoroughly elucidated that we shall reap the full value of sewage irrigation. A great deal has been done, but a great deal yet remains to be done, especially with respect to rotation of crops. It has already been established beyond a doubt that sewage can be renumeratively and successfully applied to every crop, whether grass, root, or cereal, but, with the exception of grass, it has not yet been ascertained which crop offers on the whole the best chance of a profitable return for capital expended. This is partly owing to the fact that hitherto rye grass has been the model crop upon which to experimentalise with sewage, and it cannot be denied that under certain circumstances it yields the quickest return to the agriculturist. But at the same time it is not to be supposed that the utilisation of sewage by irrigation is to stop simply at its application to grass, although it is true that that grass in another form means beef, mutton, milk, butter, and cheese. The real reason why grass has been selected as the favourite crop for sewage is not merely because, as we have already observed, it yields the quickest profit, but also because it admits of an almost unlimited and indiscriminate application of sewage. Regarding sewage in the false light in which it has been hitherto viewed, as a thing to be got rid of at any price, the application of it to rye grass offers the readiest means of accomplishing this result. This false notion of the value of sewage is now, however, pretty well dissipated, and it will before long be as carefully preserved as it is now lavishly squandered.

That the idea of getting rid of sewage instead of utilising it is not yet abandoned is rendered manifest by the manner in which the corporation of that favourite watering place, Hastings, treated their sewage last summer. They constructed works to take it away from the town and discharge it into the sea, and it has been calculated at a low estimate that the annual value of the fertilising material thus wantonly got rid of is £10,000. It is a wonder the ratepayers do not look a little more after their own interests. We should imagine that the above sum gained would relieve them of a large proportion of their liabilities. It may also be very seriously demanded whether they have got rid of it so easily as they imagine. The sea has a peculiar habit of returning things thrown into it to the shores from which they were cast. A filthy black and empoisoned foreshore we trust may not result, but it would be only a proper return to the corporation of Hastings for their wasteful folly. Among the few towns which have taken any steps within the last twelve months to practically test the principle of sewage irrigation, Warwick may be mentioned. Croydon and Barking are still the main locales of its application, and may be regarded as the "head centres" of sewage utilisation. There is no doubt but their vicinity to the metropolis, which can consume everything that is brought within its walls, is a great point in their favour, but nearly the same may be said of the suburbs of any large town. Unquestionably, the greatest difficulty to be surmounted with respect to the adoption of this principle by local authorities is the acquisition of the necessary quantity of land. We are quite willing to adopt a system of sewage irrigation, says a local board, but where are we to get the land? It was that difficulty which prevented an admirable scheme for the sewage of Bromley being carried out. As in all similar cases it is necessary to borrow money from the home government to carry out the proposed works, the question becomes one quite as much of finance as of engineering. In the case of Bromley, the plans prepared by the borough engineer, Mr. Jacob, were approved by the Secretary of State; but when the fight came, all the items relating to the land, the alleged anticipated nuisances, and the borrowing of the money, were introduced into the inquiry, and the result of the whole medley was that the decision of the commissioners was adverse to the project. The chairman of the board resigned, and the whole thing fell through. Some simpler and less circuitous method of adjudicating upon sewage schemes is needed. It is absurd to endow local boards and other authorities with so-called powers of compulsory purchase, and then virtually abrogate those powers by refusing the land that is absolutely indispensable to the execution of the scheme. If 1869 has done nothing else but to demonstrate the necessity of improved and modified sanitary legislation, the successful application of sewage in a financial point of view, and the failure of all deodorising and disinfecting processes, it will have laid a foundation for future operations that will ultimately prove invaluable.

The Fine Arts.

THE EXHIBITION OF THE WORKS OF THE OLD MASTERS AT THE ROYAL ACADEMY.

THE Royal Academy has inaugurated the first winter in its new home in the happiest manner possible, by an exhibition of the Old Masters, and associated with them two modern painters, whose names are still fresh in the recollections of their countrymen. The works selected for exhibition are for the most part well chosen and really good pictures—pictures which not only the general public will admire and value, but which must be of the greatest possible use to artists themselves, as examples of methods, models for imitation, and last, not least, subjects for discussion and argument with their brother artists.

On entering the great room, we are immediately struck with the admirable way in which Sir Joshua Reynolds holds his own, though placed with the Old Masters. His "Mrs. Siddons" is hung between two pictures of that great colourist, Peter Paul Rubens, without the juxtaposition being at all detrimental to Sir Joshua. In the same room is placed his full-length portrait of Lady Bute, the only daughter of Lady Mary Wortley Montague, and the wife of that Lord Bute who was suspected of an undue influence over the Princess of Wales. This lady was in her time a leader of fashion, but her chief claim to our attention now, to our mind, is that she was the occasion of this fine work of art. The admirable colouring is so quiet, and yet so full of light; indeed the figure is almost in monochrome, the only bit of colour being that delightful green parasol, bringing out the delicate flesh tints of the face; the landscape, too, unobtrusive as it is, is harmonious, and in keeping with the figure. This picture is decidedly one of the happiest efforts of that "first Englishman who added the praise of the elegant arts to the other glories of his country." It is a pity that "The Study for a Portrait of Miss Leigh" has been placed in this room, for it is too weak to have come from the hand of this great master; it will not bear comparison with the small equestrian portrait by Sir Joshua, hanging as a pendant to it on the other side of the doorway. There is a Titian, No. 97, in this gallery, which we suspect is wrongly named; the red drapery is very finely painted, and reminds us of Paris Bordone but the head is dull and heavy; it has either been much scraped down or else repainted. No. 97, "The Last Supper," is a possession of which the Royal Academy may well be proud, for whether the head of our Lord be by Da Vinci or not, the copy was made during the lifetime, and probably under the superintendence of the great painter himself; and from the fact of the damaged condition of the original picture, it has become almost invaluable. No. 90, a landscape by Teniers the younger, is an example for all landscape painters. The artist has managed to bring out the three figures like jewels upon the background, and yet when the eye has been satisfied by resting upon the figures, how perfect is that background! The reflection in the water and the luminousness of the sky are quite wonderful. One might sit before this picture and revel in the quaint Dutch landscape, and wonder what orders Mynheer Teniers is giving to his gardener, by the hour together. Cuyp's landscape (No. 102) is a very fine specimen of the master, glowing with life and sunshine. The impression of great truth is given in the painting of the foliage, without that painful realism with which modern landscape painters of a certain school are accustomed to worry the eye. It is instructive to note that the Dutch painters, so famous for minute details in *genre* painting, are careful in their landscape art to subordinate individual details of minute parts to the general impression of finish given to the whole picture. The two Rembrandt portraits in this room are so fine that they are beyond both criticism and praise. No. 91, Gainsborough's "Blue Boy," is as fresh as when it first was painted. The rival which has lately sprung up must be strong indeed to have equal claims with it to be considered an original picture. The best Gainsborough in the present collection appears to us the one lent by the Queen (No. 119). Where shall we find hands so painted in modern portraits? The composition is unfortunate, as the youngest princess seems to be slipping out of the picture; but this may arise from its having been cut down from a full length.

The Leonardo da Vinci in Gallery No. 1, called "La Vierge aux Rochers," is not a picture which will be interesting to the general public. It has been neglected and allowed to get too dark, the rocks also are heavy and rather take the eye away from the faces, which are very beautiful in feeling and expression. There is a very fine Vandyke in this room, a portrait of a lady, No. 26. Mr. Holford, the possessor, has kindly allowed the students in the Painting School of the Academy to copy it, and it would be difficult to find a more admirable subject, the expression of the face is so beautifully wrought out. This picture must have been painted when Vandyke was in Italy, long before those in the Windsor collection were executed, as the influence of the Venetian School is strongly felt in the colouring of this work. All Vandyke's portraits are remarkable for their *pose;* he understands so well the way to place his figures upon the canvas; there is a grand simplicity in their action, which, combined with his great powers of colouring, render him a very prince among portrait painters; he is also a portrait painter of princes. We are apt to wonder whether if Vandyke had painted a beggar, he would have given him the same refined and courtly air. No. 10, "Las Meninas," by Velasquez, deserves great attention. It is a sketch for the large Spanish picture, and it is curiously illustrative of the customs of those times when dwarfs and jesters were necessary members of royal households. No. 14, "Equestrian Portrait of Phillip IV.," is a pleasing work, but it is not a Velasquez. This truly great painter's finest works, are only to be found in Spain. On entering Gallery No. 11, we are immediately struck by the Snyder's, No. 49, "The Lion Hunt." This master's method is one which repays study, and we suspect that upon it our greatest modern animal painter has not a little founded himself. But while Landseer is remarkable for the way in which he makes the individual hairs of his paint brush tell in painting the coat of his dogs, Snyder's is no less remarkable by his method of making one broad and single stroke of his brush, answer the same purpose. The dogs in this picture are superior to the lions, both as regards drawing and execution. This shows that great as must have been the natural genius of the man; he was not able to overcome the want of nature to paint from. Dogs he could get in abundance, but a lion, and particularly a free lion, was a much more difficult model to obtain. No. 36, "The Salutation," is a remarkable Rembrandt; the way in which he has condensed the light upon the neck and shoulders of the Virgin, deserves particular notice. Hogarth's picture, No. 43, is a very striking work, though the painter's caricaturist instincts have decidedly led him to exaggerate the grief of Sigismunda. No. 59, Titians "Portrait of a Doge," is a glorious work of art, painted probably in Titian's early manner, when the feeling of Bellini still clung to him. The portrait has been very badly repaired, if we may dare to say so of a picture belonging to that celebrated art critic Mr. Ruskin. Raphael is but poorly represented; most of his fine works, if we except his cartoons, are on the Continent, and those in this country are difficult to get at. No. 61, "A Holy Family," ascribed to him, is more probably a Giulio Romano.

The publication of two lives of Albert Durer, at the same time, and so recently, has called much attention to his works, and in this room is a good specimen of the master, "The Coronation of the Virgin," No. 55. If we had not been so strongly ordered to admire Durer in all and every part of his performances, we should have submitted that the landscape and accessories, such as the wings of the cherubs, are by far the best part of this picture, both as to colouring and detail, and that the heads are somewhat bullet-like in shape. The Mantegna hanging next to this picture, belonging to Lady Eastlake, is a very fine one, and a more favourable specimen of this painter than No. 58, "Christ on the Mount of Olives," for in this picture he has carried his improved method, according to Vasari, of foreshortening to rather too great an excess.

All art students should carefully study the two unfinished pictures in Gallery No. 4, "the Judgment of Solomon," by Giorgione, and "A Holy Family," by Michael Angelo. It is most unfair that Giorgione's picture should have been stippled all over, so as to give it the appearance of finish, while it is in reality only begun, and the sooner this abomination is removed by some skilful and able repairer the better. It is natural to suppose that the painter intended to have added other figures on the left-hand side of the picture, behind the executioner. The similarity of the composition of this work with Raphel's cartoon of "Elymas the Sorcerer," even extending to the action of some of the figures, is at once apparent. As these pictures must have been painted at about the same time, it is possible that both painters took for a model some ancient bas-relief, well known at that period. The Michael Angelo shows the green ground of terre-verte for the flesh in several places, the marks also of its being traced from a cartoon are distinctly visible. Sir Joshua Reynolds is said to have scraped down a Venetian picture till he came to the ground, to find out the method used, but here we can see the great painter's method from the earliest to the latest stage on the same canvas, and a careful study of this picture will convince the student of the painter's strict adherence to a system of painting most clearly leading to a safe result. Is it from ignorance that this method of painting flesh on a green ground is, as far as we know, never used in the present day? It is sad to see the cracks in the "Portrait of Vittoria Colonna," by Sebastian del Piombo, No. 149, the divine Vittoria, as Michael Angelo called her. He should have painted her himself, and given her that other attribute of the divine, immortality. However, this portrait is now evidently taken great care of, and placed under glass, so the injuries may very probably go no further. It is as well to say that they are made much more apparent by bad repairing, which might be removed. No. 127, "View of a Dairy Farm," by Paul Potter, is an exquisite landscape, painted with that feeling for sunlight common to many Dutch painters. The minute details of the grass plat are very sweet and true to nature. No. 126 and No. 134, "The Portraits of Rubens and His Wife," by Rubens himself, are lent by the Queen, and are in excellent condition. They are quite a lesson in portrait painting, from the ease and freshness with which they are executed. The portrait of Rubens' wife has originally been painted on a smaller canvas, and has been added to later, perhaps to make it the same size with her husband's, so as to serve as a pendant to it in the Royal collection. The join at the lower end of the canvas comes through the middle of the hand, but it is so beautifully managed that it is only perceptible after the closest inspection. This portrait has been painted with greater delicacy of feeling than is usual with Rubens, for much as we may admire his colouring, he is undoubtedly a coarse painter. No. 147, "The Portrait of Edward VI.," said to be by Holbein, is not an original picture. Compare it with the two Holbeins from Windsor Castle, and that it is

not by the same hand is distinctly visible. We much doubt if "Sir Thomas More" be a Holbein, and not rather by another master of the same period. If it is by Holbein it has been much worked upon. No. 111, "Portrait of John, Elector of Saxony," called a Holbein, we are strongly inclined to think a Mabuse, and a very good one it is. Mr. Holford's other Holbein in the first room, "The Portrait of Lord de la Warr," is more probably a Gwillim Stretes. As all good jokes are given to Joe Miller, so all good pictures of this time are ascribed to Holbein. Critics forget that there were several men, nearly, if not quite as great as Holbein, living and painting during this period.

No. 148, a landscape by Bellini, is a very beautiful work—peculiarly minute and realistic. It is impossible in so limited a space to notice all the fine pictures in this collection, much less those by Leslie and Stanfield. These latter we may return to at some future time; but we cannot close without calling attention to the wonderful "Altieri Claude," No. 142. The history of this one picture alone would require an article to itself. In conclusion, we must remark that the love of the Old Masters grows with the study of them, and we sincerely trust that this short notice may induce many to go and examine them for themselves.

SOCIETY OF FINE ARTS.

THIS society held their first meeting on Thursday, the annual general meeting being followed by a lecture entitled, "Blessing the Cornfields; or, Landscape Art in Poetry."

Mr. Bayliss, the lecturer, observed that the theme of Art was at first action, then beauty, then passion; each school not copying its predecessor, but adding a new domain to the empire of art. But these schools, absorbed each in the realisation of its chosen phase of human life, missed altogether any adequate conception of that other life; the life of nature, where only we find beauty without sensuality, and passion without suffering or sin. This life of nature has now become the theme of the painter and the poet, who have learned that it is glorious for its own sake, and who see in landscape art the shadow of the lost paradise, and the promise of the paradise to come.

After some discussion on the various points raised in the lecture, and especially on the subject of idealism in landscape art, the proceedings closed.

ARCHITECTURAL ASSOCIATION.

AT the usual fortnightly meeting of this Association on Friday evening last, the President, Mr. L. W. Ridge, in the chair, Messrs. H. J. Wright, W. T. Hollams, and A. H. McMurdo were elected members. Mr. Douglass Mathews, Hon. Sec., referred to the career and death of the late Mr. James Wylson, "The Father of the Association," of whom a long obituary notice appeared in last week's BUILDING NEWS.

Mr. CHARLES BAILY, of the City Architect's Office, Guildhall, then read a paper entitled:—

NOTES ON SOME OF THE TIMBER BUILDINGS IN ENGLAND DURING THE MIDDLE AGES.

As a general rule, when our ancestors were about to build, they adapted to their use the the materials which were readiest at hand. We are, therefore, not surprised to find so many of the old buildings constructed for the most part of wood; for in the Middle Ages, large districts of England were covered with vast forests of timber, chiefly of oak. It is possible that the oldest wooden work that we have now remaining in England is a part of the church at Greensted, near Ongar, in Essex. These remains consist of the upright sides of the nave, and are formed of the slabs of oak trees, placed in a vertical position, the narrow edges being chopped down to bring the slabs pretty close one to another, and which are tongued together to keep out the weather. The slabs at the ends are brought to a uniform thickness by cutting off, in wedge fashion, a portion of the rounded sides, and are inserted into timber sills and plates, and secured with wooden pins. The convex sides of the slabs are placed outwards.

Previously to the year 1849, very much more of the original building existed, but at that time the church underwent that terrible ordeal of alteration, destruction, and smartening up, known as church restoration; and when these works were completed, the only original parts which were left were these oak slabs. Internally the old building was lined with a thick coat of plastering, and this was laid directly on the slabs, a key being formed by cutting or jagging with an adze the internal surfaces of the same. This mode of forming a key appears to prove that the plasterwork was original, for had the timbers been in an old and dry state when the semi-shavings were cut, the same would probably have split off altogether instead of curling outwards, as was requisite to hold the plaster. This building was undoubtedly of very great antiquity; the tradition of the neighbourhood, which states that it once enclosed the remains of Edmund, King of East Anglia, is in the main probably true. The thickness of the slabs appears to be about one-fourth of the diameter of the tree; the square timber from the centre very probably was used in the construction of the roof and the other parts of the building, which was 29ft. 9in. long, by 14ft. wide. There does not appear to have been any provision made to admit daylight—another piece of evidence that the building was a case to enclose the remains of the martyred king—and when any light was required, it was very likely obtained by torches.

With the exception of a few roofs, we do not possess much by way of timber buildings before the commencement of the fourteenth century, and where such are found, they are but fragments. There is a curious arcade on small columns, forming an open gallery front to an upper story in the chancel of Compton, in Surrey. It is of late Norman date, say about the year 1140 or 1150. This gallery was most likely for the purposes of the Rood Loft, or for the display of relics, or it may have been the spot which the priest occupied when blessing the faithful.

On the side of the Church of Hartley Wintry, in Hampshire, is a doorway with highly pointed arch, in the hollow mouldings of which the four-leaved flower known as the dog's tooth, is cut, the whole being in wood. Moor Hall, at Harefield, near Uxbridge, was a "camera" of the Knights Hospitallers of S. John of Jerusalem. It is a building of timber—a single room for the use of the officer who had the supervision of the estate, and his servants. It is, doubtless, the work of the middle of the 13th century, and has a fine roof of open timbering of three bays; one of the principals has a very elaborately moulded arch beneath a cambered collar beam; in the arch is cut the dog's tooth flower, and over the collar is a king-post supporting a minor collar and leon beam.

Roofs of timber buildings are more often constructed with than without tie beams. The roof of Moor Hall spread somewhat for want of one, but this was obviated by inserting a beam at the springing of the arch, from plate to plate, and which beam is nearly as old as the arched roof itself. Near, but not adjoining to this wooden room is a storehouse, also of 13th century work, but built with rubble walls, having several lancet windows in the sides, and a triplet at one end. The interior is plastered, which is jointed with red lines to imitate masonry; at the intersections of the lines are roses. The wooden room is 45ft. long × 29ft. wide. The Store or Granary is 35ft. long × 18ft. 3in. wide, and had originally two stories; the upper was approached by a wooden staircase, as may still be seen.

Of timber buildings erected in the 14th century, we have many still left, and 20 years ago had many more. The tasteless, cruel, unnecessary and shameful destruction of such interesting and curious examples as the Refectory of the Monks at Great Malvern, the Guesten Hall, and the Old Deanery at Worcester, and the very curious wooden cloisters near to S. George's Chapel at Windsor, cannot be alluded to without expressing feelings of contempt and indignation. These buildings were erected in the early part of the 14th century, and at this period many porches of oak timber were attached to churches in many parts of England. Those at Radwinter, Hempstead, and Alkham, in the county of Essex may be referred to as fine and varied types, but perhaps the grandest and at the same time the most perfect, although not less than five centuries old, is at Boxford, in Suffolk. This porch has a finely moulded entrance to its front, and a rich barge board above; each side has two bays of open tracery, with highly pointed arched heads, each two lights wide. The inside is grained in two bays, with moulded ribs springing from triple columns, with moulded caps and bases attached to the sides. This porch is certainly more than a century older than the church to which it forms an approach. Judging from the few which have lasted to the present time, it would seem that timber was not a favourite material in the 14th century for building churches. There is one, however, at Besford, in Worcestershire, belonging to the early part of the century, and another at Marton, in Cheshire, of a later date. In both these examples the sides are formed of timber framings, and the spaces filled in with plaster and loam, much after the same fashion as was adopted in house building, and which will be particularly described hereafter. It ought to be here mentioned that the door-heads in both of these churches are of the ogee form of arch, a very favourite shape for door-heads in Worcestershire, Cheshire, and Warwickshire.

In the county of Essex are a number of very curious belfries, built about the middle of the 15th century, and attached to churches. Those at Blackmore, Margaretting, and at Stock are erected of timber from the ground, having but a slight foundation of rubble below the oak sills. The noble balks of timber forming the main upright supporting posts are of astonishing size; at Blackmore, which is the largest and finest example, each of the four principal posts contains not less than two and a half loads of squared oak timber, and all the other timbers are in proportion. This belfry, which is three stories high, measures 30ft. square on the ground floor.

The belfries at Shenfield, Chipping Ongar, Mountnessing, and Willingate Spain, are framed of timber and rise from the ground, but stand within the walls of the churches; that at Bowers Gifford Church rests on the walls of the stone tower. A very good example of the same sort of belfry is to be seen at Cowden, in Kent. It is a fine and bold piece of timber construction.

Standing just within the walls at the western end of the nave are six upright posts, three on either side, each containing the best part of a large oak tree; those at the angles, at their lower ends, measure 18in. × 15in. in their sections, and enlarge at the tops to 21in. wide; these angleposts are now about 14ft. long.

These posts once rested on a timber plate or sill, which, having decayed, has been removed, and the ends of the timber have been underpinned with brickwork. The two intermediate posts are even larger, and measure 21ft. wide × 17in. at the top. All the posts are somewhat cambered over at the upper ends, the natural bend of the trees being taken advantage of for this purpose. The two centre posts are longer than those at the angles, the upper ends terminating at a higher level by about 5ft. These six wooden pillars carry three framed principals, dividing the enclosed square space into two bays. The centre principal is merely a massive tie beam or girder, 17in. × 14in., laid flatwise over the posts, with curved arched braces 2ft. wide and 8in thick, framed in underneath.

The principals on the east and west of the enclosure are of a more complicated characted than that in the centre, the tie beams resting on the posts at a lower level, and supporting additional pieces of framing to make up the difference in height. The reason of this arrangement in the design is evidently to obtain a bearing for other arched ribs, which are set at right angles with those in the centre principals, giving to the present ringing chamber somewhat the effect of being groined, with the exception that these ribs spring from the centres of the sides of the square instead of from the angles.

It was in the autumn of the year 1865, when I sketched this belfrey. I was then most anxious to inspect the construction of the spire which is carried on the substructure just described, and with that intention I ascended the steps which lead to the bell-chamber. With some difficulty I lifted the heavy trap-door, when in an instant to my horror, I discovered that I had upset a hornet's nest which for some months had hung near the warm window in the western gable of the church. It needs but few words to describe how soon the trap-door fell, and how fast I came down the ladder, and into the churchyard; when fortunately, not one of the venomous insects found its way through the defective floor into the

chamber below—but the survey of the spire hadt of course at that time to be abandoned. But I had left my book in the ringing-loft, and moreover I had not finished my sketch. After some consideration, I again very quietly returned. I could distinctly hear the warning buzz overhead, but as rapidly as possible I scratched in the completing lines of the subject, and the drawing now exhibited to you is the result.

There is so little ornament about this belfry that it is difficult to state its exact age; it is most certainly of much later date than the church itself, which it is pretty certain was built about Anno Domini 1340 to 1350, and the structure of the belfry may be a century later. Of timber buildings erected about the middle of the 15th century and after that time, we have a great number still remaining, and in something like a perfect condition. I shall, however, on the present occasion, confine myself to those of the domestic class.

In the southern districts of England the old English manor-houses, the houses of the gentry generally, as well as those of the better class of the yeomanry, were very simple in the plan, and very often exhibited a singular uniformity of design. In the centre was the hall, at the end of one side of which was the principal entrance to the house, a portion of the hall being cut off by a screen to form a passage through the house from the front entrance to that at the back, which was directly opposite.

On the side of this passage (known by the name of "the entrye," and sometimes called the "screens") and opposite to the screen, were generally three doorways, as at Crowhurst Place, in Surrey, the seat of the Gaynesfords; sometimes, however, there were but two, as is the case at Great Tangley, in the parish of Wonersh, in Surrey. In both these examples the first of these doors opens into a parlour; at Crowhurst the second leads to a staircase, and the third to the butteries, kitchen, and to the whole of the domestic offices.

In the screen were two openings, without doors, through which the hall was entered; beyond the upper or dais end of the hall were one or several rooms of a more private character than either the parlour or hall: the sleeping-rooms were generally in the upper stories. Externally there was usually a recess in the centre of the front, formed by one side of the hall, as we find was the case in the house of Great Tangley, as originally built. At either end of this central recess was a gabled projection, the one forming a porch over the entrance, the other a bay window to the hall. Beyond these were two larger gabled ends, one enclosing the parlour and offices, the other the more private rooms before noticed.

The plans of houses of course somewhat varied according to circumstance or size and importance; but the arrangement here described was in the 15th and 16th centuries a very general type. Ockwells, sometimes called Ockholt, in Berkshire, is after this fashion; and Crowhurst Place and Great Tangley are also very good examples.

Sometimes the size of a house was increased by the addition of several apartments, which surrounded a courtyard in the rear of the front buildings; in such cases the hall was often approached from the quadrangle, and formed one of its sides. This occurs at "The Mote," at Ightham, and at Penshurst Place, both in Kent.

But whatever was the general plan, the peculiar arrangement of the great hall, with the screens at its lower end, the entrances to the offices behind it, and the dais at the upper end of the room, appears to be all but universal, so much so that it is found alike in the palaces of the king and of the nobles, and in the houses of the middle classes of society. We see it at Eltham and at Hampton Court, at Mayfield, at Croydon and Lambeth, at Penshurst, and at most of the halls of the Colleges at Oxford and Cambridge, as well as in those of the Middle Temple, and Staple Inn, London; and, indeed, at many other places too numerous to notice in this paper.

In the "Archæological Journal" (vol. xxiv. p. 57) is given a translation by Mr. Joseph Burtt, Assistant-keeper of the Public Records, of a most valuable and interesting document from the muniments of the Dean and Chapter of Westminster. It is a contract for building a hall at Hammes, or Hamsey, Sussex, and is dated the 6th day of March, 14 Edward II. (A.D. 1321). This contract is between "Sir Geoffrey de Say, knight, on the one part, and John Rengwyne, of Wogham (*Offham*), mason, on the other part;" that is to say, "that the aforesaid John shall make, on the said Geoffrey's manor of Hammes, four walls of stone and chalk for a hall, of the which the two side walls shall be 60ft. long on the inside, and 24ft. high from the ground, and the two ends shall be gables of such a length that the hall within the walls shall be 30ft. in width, and of such height as the roof of the hall will permit. And the said John shall make in the gable towards the west, which shall be at the dais of the said hall, a fire-place which shall be 6ft. in width within the jambs, and on the side of the said hall towards the south, another fire-place of 9ft. in width, and the shafts of the two chimneys shall be carried 3ft. above the roof of the hall. And the said John shall make in the side of the said hall towards the north, three windows, with transoms, each 6ft. in breadth, and of such a height as the walls will permit; and on the side towards the south there shall be the door of the hall, of convenient width and height, and two windows agreeing with the windows on the north side; and in the gable towards the east there shall be three doors, one for the pantry, another for the buttery, and the third for a passage to the kitchen."

This part of the contract has been here quoted to show that the arrangement here described exactly agrees with that given above, and proves what a very general plan it was.

The contract obliges the said John to "dig, draw, and cut all the stone that shall be required for the aforesaid walls, doors, windows, and fire-places in all the places where the said Sir Geoffrey sees it to be to his advantage, except the stone which shall be for the hearths and the backs of the said fire-places against the fire. And the said John shall dig the sand for all the aforesaid works, and shall find lime at his charge, as well as for the said works as for covering all the hall and the pent-house. And the said Sir Geoffrey shall have carried all the said stone, lime, and sand on to the place where the hall shall be made; and he shall give to the said John for his work, and all other expenses aforesaid, thirty-five marks and a quarter of wheat, and shall pay him from month to month according to the progress of his work."

It will be observed that this contract is only for the mason's work, nothing being said about the roof and the other carpenter's work, nor the works of the other tradesmen.

The Great Hall of the Palace of Westminster, and the Guildhall of the City of London, are the exceptions to the rule; at Westminster the chief entrance is in the north end of the building; and at Guildhall it is in the centre of the south side; in each case through a finely-designed porch; but both these cases must be considered in a different light from the hall of a manor-house, as these two halls were attached to adjoining buildings only by mere passages, and were nearly insulated on all sides.

(*To be continued.*)

ART NOTES FROM ROME.

THE annual distribution of prizes at S. Luke's Academy took place on the 27th ult., being the Pope's name-day. The first prize in painting was taken by the Roman artist Guerrino Guardobassi, the second by Angelo Carosi, of Carbognano, and Cesare Caroselli, of Genazzano. The first prize in architecture was conferred on a son of Tenerani, the sculptor (lately deceased), who as president of the association would have had the happiness he had much desired of bestowing it with his own hand had he been spared a few weeks longer. Monsignor Ciccolini pronounced an oration celebrating the benefits Pius IX. has conferred on the arts. Betti, the oldest member of the association with the exception of Minardi (confined to the house by ill-health) spoke in moving terms of the losses the Academy has sustained in the course of the past year in the painter Fracassini, the architect Poletti, and the sculptor Tenerani, as well as in the veteran German artist Overbeck. Tenerani will be succeeded in the presidency of the Academy by Coghetti, whose rich and vigorous frescoes at Santa Maria in Trastevere, and other churches, are familiar to all who know Rome; and as curator of galleries and museums by Giaccometti, known chiefly by his great work, the viaduct of l'Arriccia.

THE MONASTIC ORDER OF BRIDGE-BUILDERS.

MR. C. B. VIGNOLLES, the newly-elected President of the Institution of Civi Engineers, in his inaugural address, referred briefly to the order of Monastic Bridge Builders. This celebrated order was founded about the close of the 8th century. Their reputed founder was St. Benezet, who, from the humble calling of shepherd, became the builder of the bridge over the Rhone at Avignon, about A.D. 1180. The recognised title of a Monk-Engineer of this order was, in the barbarous Latin of the middle ages, PONTIFEX (*Constructeur de Ponts*) bridge builder. Hence, we infer "Engineer in Chief" to be a translation of the title, "*Pontifex Maximus*," although before the Christian era such designation was attributed to the chief high priest of a heathen temple, and is now deemed, as it nevertheless was in that same twelfth century, solely applicable to the Pope of Rome.

This Monkish order of bridge builders, which may be characterised as the first Institution of Civil Engineers, continued almost uninterruptedly for several hundred years; it is not certain whether they were quite separate from others, their purely ecclesiastical brethren, but they were a mendicant order, solely, however, for raising funds for bridges. History records few of the names of these pious Engineers, but the last was the monk Romain, who, after long previous good service under Colbert, became one of the first, if not the very first, of the Engineers of the Corps de Ponts et Chaussées of France, when that institution was, after many vicissitudes, finally constituted in the early part of the last century.

THE NORTHERN ARCHITECTURAL SOCIETY.

THE members of this society held, on Tuesday last, their eleventh annual meeting, the President, Mr. Thomas Oliver, in the chair. The ordinary report, which contained a review of the operations of the society for the past year, and which drew attention to the subjects referred to at the close of the President's address, was read by the Secretary and confirmed. The financial position was stated to be good, there being a balance in hand of £9 9s. 11d. The arrears of subscriptions were stated to amount to £26 7s. The annual address was then delivered by the president. He concluded a general review of the architectural events of the past year by a few remarks on the work accomplished by the society, its present position, and its prospects as to the future. What they were going to do would greatly depend upon themselves, but more especially upon united action on the part of the executive and the junior members. The first thing which they ought to do was to secure a diploma, and all other things would follow in its train. He had long held this view, but had never until now realised how soon this might be accomplished. They must put themselves under the Government of their country, at least to this extent, and they would be the better qualified, educationally, morally, and socially, to execute the duties of their position. A brass plate with engraven name should not constitute an architect; he should be a man of education, a man of science, imbued with art-feeling, high principled, strictly honourable, beyond suspicion. He stands in his position towards his country responsible for the life and limb of those under his direction, as well as for those for whom he constructs, yet his country makes no provision for his education or for the assurance that he is competent to undertake these high responsibilities. Mr. Oliver added—I am well aware of the difficulties and even the disadvantages that attend the establishment of an architectural diploma, but these, as in the case of both the legal and medical professions, may be readily overcome or even turned, as in the instances referred to, to the well-being of the profession. He next sketched a plan on which the diploma might be granted to existing architects and procured by future applicants, the system being, in the main, that adopted some years ago, in reference both to the legal and the medical professions. He pointed out, in some detail, what ought to constitute the educational qualifications for candidates going up for examination, and, lastly, alluded to the proposed architectural library, sketching class, and visiting class.

There are 2814 lighthouses in the world. The coasts of Europe have 1885; America, 774; and Asia and Oceanica has 165.

Civil Engineering.

THE FRENCH SYSTEM OF ENGINEERING.*

THE Decree of the 1st February, 1716, marked the date of the actual establishment and definite organization of the Corps des Ponts et Chaussées. A hierarchy of Engineers was then created, which, though the duties first attributed to them have since been vastly extended, still exists in its leading features, on a system perfectly adapted to fulfil the purpose of keeping everything in the shape of what we call in the present day "Public Works," strictly bound under Government control.

As now constituted, this Corps des Ponts et Clausées forms the most important branch of the Government department in France, designated as the "Ministry of Agriculture, Commerce and Public Works." It is impossible in a brief sketch, such as I am attempting, to give more than a faint idea of the importance and many ramifications of this ministry, which includes the direction, inspection, and in many cases the carrying out of what, in this country, are assigned to various and generally independent bodies, or are not looked after at all, at least systematically. The Agricultural Branch is charged with the details and statistics relating to cultivation, produce of crops, drainage, irrigation, &c., with the supervision of the numerous farm and veterinary schools, the chambers of agriculture, and various other similar establishments; with the inspection of the river fisheries, with the regulation of the sea bathing places, and the mineral water springs, and with sanitary affairs general and special.

The Commercial Branch attends to assure companies and tontines, to internal and external commerce, the valuation of custom-house entries, to the regulation and management of every mercantile port on coast and river, and from the grand emporiums of Marseilles and Bordeaux to small fishing villages; it guards the various museums of and all that relates to arts, trade, or manufactures generally through associations and schools; to the inspection of weights and measures, to the tobacco and gunpowder manufactories, and the protection of children in factories, to the control of all exchange agents and brokers, and of the various chambers of commerce established in every department and in the principal towns. The Engineering Branch inspects and controls every railway, canal, and navigable river, whether completed and in operation or only in progress. It brings every mill and manufacturing establishment, worked either by water or by steam, under its direction; mines, sunk or open, beds of of minerals, quarries, and collieries, come under its regulations, and, of course, all steam engines stationary or locomotive. Also all establishments for electric telegraphs, water or sewerage, and the streets and improvements of towns. A special office is devoted to the management of all the lighthouses, channels, and buoys on the coasts, estuaries, and harbours. The construction and repair of highways and carriageable roads of every class come under its control. The supervision of the various scholastic establishments connected with Engineering. The special school of the Ponts et Chausées itself, established soon after the corps was organized; the School of Mines, the School of Arts and Manufactures, and the Engineering course of the Ecole Polytechnique. Within the category of its duties come the Topographical and Geological Surveys of the Empire, and the whole extensive system of levels and contouring, and the publications of maps and profiles; further, it establishes the minute regulations for the preparations on fixed scales, of every plan and section intended for the purpose of soliciting a concession, and for every stage of the works subsequently executed. Finally, it has to report upon every concession demanded for any object previous to presentation, through the Minister of State, to the Crown, for ratification or otherwise.

Thus this "Ministry," combines in itself, and becomes, theoretically, responsible for many of the duties performed in this country by the "Standing Order," and other committees of both Houses of Parliament, by some department or other of the Board of Trade, the Custom House, the Ordnance Survey Office, the Hydrographical Branch of the Admiralty, the Trinity Board, the Woods and Forests, the Board of Health, and other public Boards, and commissioners, by the county, city, and borough surveyors, by the way wardens, and by innumerable local officers throughout the United Kingdom; besides many other duties and functions which in this country we have had no thought of creating for the purpose of control, but which are vested in this ministry by their perfect system of centralisation.

To keep this enormous machine in good working order, the subdivision of labour and responsibility has been carried to an extent, which is a striking proof of the organising faculties of the French. There are in Paris about thirty-two Bureaux, each with its staff of chief, deputy, and clerks, of which fully one half have their attention devoted exclusively to public works. So of the almost as many permanent commissions sitting in Paris, each with at least a dozen members, besides councils and chambers of agriculture and commerce for each of the eighty-nine departments of France and all the principal cities. Further, there is a staff of engineers for each department and every great town in the empire, and for every railway, canal, and other establishment in working, besides engineers detached on leave to assist and profit by experience to be gained in the management of railways or a private undertaking, and not a few are similarly allowed to look after public works of various kinds in foreign countries.

For the Public Works, the corps has 877 engineers in eight classes, of which 134 belong to the division of mines, and 4343 conductors, in five classes, of which 149 are mining guards. In addition, there are 275 harbour masters and other port officers. In the whole, 5495 employés, at the present time nominally available, and 150 officers are invalided with retiring allowances, there being nearly 200 widows of deceased officers in receipt of pensions. The Ecole des Ponts et Chaussées has fifteen professors, mostly from the corps, eight teachers, and thirty other persons on the staff for regulation purposes; at present, however, there are only 55 pupils at the school. The Ecole des Mines has 16 professors (mostly engineers), 8 teachers, and a large staff besides. There are only 9 pupils. The two working mining schools at St. Etienne, and at St. Alais have 13 professors and teachers. We have often heard of the admirable modern management of the streets of Paris. To effect this, there are specially appointed 16 engineers of all classes, and 152 conductors, who have charge of the public streets, roads, foot pavements, promenades, plantations, water supplies, and sewerage, all appointed by the minister, but paid for by the municipality of Paris. I am not now considering the cost, but merely the organisation, which is certainly most complete and effective in its results.

The late Mr. Hosking, professor of engineering and architecture at King's College, laid it down as a maxim, that it is "the combination of the workman and the man of science that forms the civil engineer," and I adopt the definition as we all must. But the engineer of the Corps des Ponts et Chaussées is a highly educated scientific gentleman, and, as our esteemed member, Mr. Calcott Reilly, said in a debate a few weeks since—and there can be no better judge—"These engineers are all mathematicians." No doubt; but very few probably are at first practical men. These are found in the class of Conducteurs des Travaux et Grades-mines, and the young engineers are usually wise enough, till they acquire their own experience, to rely on them, they being generally really workmen.

These conductors of the Corps des Ponts et Chaussées are a most valuable, and in the main, trustworthy body. They are entered, first, into the lowest of the six classes into which they are divided, at the average age of about twenty-five, after having served an apprenticeship to some master workman. By the time they are fifty, they get to rank as principal conductors, and after a further service in that rank, varying from three to thirteen years, they obtain appointments as Sub-Engineers, but rise no further from want of sufficient previous education; they may be considered as the corporals, sergeants, and sergeants-major of the corps. Those of higher grade (the commissioned officers as it were of the corps) enter the Ecole des Ponts et Chaussées at about twenty-one, and at the end of three, four, or five years are usually qualified for, and pass their examination, being then appointed as ordinary engineers of the third class, at which period they are not far from five-and-twenty. They then rise through all the ranks of the hierarchy, until they attain the position of inspector-General of the first class (the highest grade) after a service of thirty-six years, on the average. I have not been able to ascertain the rules of promotion, but I find that three officers of the same age who entered the school on the same day, and after five years' tuition, also obtained their first appointments as junior engineers on the same day, served respectively, thirty, thirty-three, thirty-six years before attaining the highest rank—so I infer that the promotion is not altogether by seniority. Neither can I get any reliable information about their pay, except that the first forty engineers-in-chief of the first class, each having served about thirty-five years in the corps, on the average, appear to be entitled (under what circumstances I know not) to a salary of £320 a year.

Such are the arrangements in the celebrated Corps des Ponts et Chaussées of France, which manages everything relating to engineering in that country, binding every one, native as well as stranger, not belonging to the corps, who desires to act in that profession, with a thousand ties of, what an Englishman calls, *Red tape*. In theory the system is perfect, but it drags along terrible slowly according to our ideas—and we must come to the conclusion that however powerful to control, it is ill adapted to originate; yet it must be confessed that they are intelligent learners, and if tardy in following, they do follow, and improve; and they do certainly, after the realisation of facts, generally establish with accuracy the right mathematical principles on which they should be based. At the same time it would be doing great injustice not to state that many engineers of historical celebrity belonged to the corps of the French Ponts et Chaussées. I mention only Riquet, of the Languedoc Canal; Romain, the monk; Belidor, who was also a military engineer and artillery officer; Perronet, Gauthey, but there were, and are, many others both in former and in modern times.

This complete organisation is kept up by the strictest supervision. Among other regulations is the preparation annually of a volume or directory of five hundred closely-printed pages, chiefly tabular—bulky as the annual list of our army. It is interesting to turn over the leaves, and I shall place in the library a copy of the last publication for 1869, by way of voucher for the analysis I have given you. The book records the names, rank, duties, station and address of the persons, little short of six thousand in number, whose various attributes are set forth in it. The dates of birth, and their successive steps in the corps; of officers, from pupil to inspector-general; of conductors, up to their becoming sub-engineers. The work of each Bureau Commission or chamber is defined—in short, everything that has to be done or doing, to be inspected or controlled; but there is no record of works executed, except occasional and voluntary contributions from engineers to a separate official publication, by the department entitled the *Annales* of the Corps commenced about forty years ago and still regularly continued. These annals contain papers of the same character as those which appear in our own printed minutes; but they set forth, in addition, every decree and ministerial decision upon points of engineering practice; especially in the working of the conditions in concessions granted. These can only be compared to a collection of reported law cases on these subjects, which in fact they really chiefly are.

* Extracted from the inaugural address of Mr CHARLES BLACKER VIGNOLLES, President of the Institution of Civil Engineers.

CIVIL AND MECHANICAL ENGINEERS' SOCIETY

ON December 17th last we gave an abstract of a paper read by Mr. R. M. Bancroft, before the Civil and Mechanical Engineers' Society, on the "Renewal of the King's Cross Station Roof." After the paper was read, a discussion ensued, and several questions were put to Mr. Bancroft, which he answered at the adjourned discussion on the 12th inst., as follows:—

In conformity with the wishes of several members present at the reading of my paper on the Renewal of the King's Cross Station Roof, I have collected some particulars of weights and prices of other roofs, which I trust will be interesting to those present. At the same time I beg to submit further details of the roof in question and I must here remark that I have had every facility afforded me by Mr. Richard Johnson, Engineer to the G.N.R. Company, who has a

second time kindly consented to allow this society to inspect the drawings now before you.

In the glazing of this roof, the putty used was that manufactured by Sir W. A. Rose and Co., 66, Upper Thames-street, and called by them "Thermoplastic" putty. It is peculiarly adapted for fixing the glass in roofs of railway stations, greenhouses, and other buildings where plate-glass and iron sash bars are used. This putty hardens in a few hours after being used, but will when exposed to solar heat sufficient to cause the expansion of the glass and metal, become plastic, and on cooling again return to its original firmness, thus preventing the loss by fractures and leakage which occur so frequently, indeed, almost always, in places where the ordinary glazier's putty is used.

In regard to the weight, I have prepared the following table, which shows the total weight of the ironwork in one bay of twenty feet in the new roof at King's-cross :—

		cwt.	qrs.	lbs.	Tons.	cwts.	qrs.	lbs.
	Weight of Rib when put together exclusive of cast iron				7	11	1	9
No. 4	Lattice purlins	7	0	1	1	8	0	4
8	Trussed do.	3	2	27	1	9	3	20
2	Ventilators at bottom of glass ...	3	0	27	0	6	1	26
8	Z bars 20 ft. long ...	1	2	3	0	12	0	24
2	∠ irons 6″×3″ for ventilator	1	3	13	0	3	2	26
4	∠ irons 4″×2″ do	1	0	18	0	4	2	16
3	T iron arches for lantern	1	1	11	0	4	0	5
6	T iron brackets for lantern	0	0	21	0	1	0	14
	30ft. super ridge cover at 4lb. per ft.				0	1	0	8
60	T iron glazing bars (8′ 6″) = 45lb. each				1	4	0	12
120	„ (8′ 3″) = 43lb. each				2	6	0	8
4	Intermediate rafters H iron 20′ 10″ long, each 5cwt. 0qr. 17lb.				1	0	2	12
8	Wrought iron angle brackets under ends of purlins 6½lb. each				0	0	1	24
4	Lugs top of intermediate rafters, 4lb. each				0	0	0	16
4	Castings at foot of rib 2cwt. 0qr. 8lb.				0	8	1	4
4	Bolts and nuts to do. 1½lb.				0	0	0	6
4	Cast iron shoes to intermediate rafters ...				0	1	1	4
					17	3	2	14

The upper portion of the scaffold overhangs the main body of the travelling stage twenty feet on either side, enabling the glaziers to uncover the bay in advance, and to cover the last completed bay, while two entire bays are occupied by the workmen engaged in the removal of the old wooden laminated rib, and fixing in the new iron rib, substituted for it. Mr. John Jay, of Euston-road, is the contractor for the work, who was also employed in the construction of the old roof, 19 years ago; the work being under the control of Mr. Richard Johnson, Chief Engineer of the Great Northern Railway Company. The whole of the iron work is sublet to the Thames Iron Company.

Having given these additional particulars of the roof at King's Cross, I will now give a slight account of one or two other roofs of somewhat similar construction in London and the provinces, in the first place taking that over the Market Hall at Derby.

DERBY MARKET HALL.

The area covered by this arched roof is a rectangle 192ft. long, and 86ft. 6in. wide. It is divided into eight bays of 24ft. each. The roof is hipped at both ends, and therefore there are only five ordinary principals of 81ft. 5in. clear span. These principals consist of wrought iron arched ribs, the inner and outer curves being true circles struck from the same centre, with radii of 43ft. 9in., and 41ft. 5in. respectively, as shown in the sketch, the springing of the rib being 7ft. 6in. above the centre. The height of rib at crown is 62ft. 10in. above the floor level. The wrought iron rib is of the same depth throughout, and consists of 5-16in. thickness of web, and top and botton flanges each of two angle irons 3½″ × 3½″ × 7-16″.

At every alternate supporting place of the purlins, the web is joined by means of the joint plate 1′9″ × 10½″ × ½″ thick, which plate is also rivetted on to the web at the other purlins as a strengthening plate. Angle irons extend always over two lengths of the web. The web is ornamented with a neat design of holes punched out of the solid plate. The larger holes were punched out by a screw press, with long levers and heavy weights attached to them. When brought once into the swing, the momentum sufficed to drive the punch through the 5-16 web plate. The rib carries wrought iron lattice purlins at intervals of 6ft. 9in.

The iron work for one bay weighs 14¾ tons. The rib or principal being 5¼ tons, purlins, standards, &c, 9½ tons.

Each rib is supported on cast iron columns, 23ft. high from floor level to bottom of gutter of an octagonal section, and thickness of metal 1½in.

Opened 29th May, 1866. The Hall is 220ft. long, and 110ft. wide, and is covered by a semicircular wrought iron roof, in one span of 86ft, 6in., and two small side roofs of 12ft. span; the wrought iron principal ribs being carried by 22 ornamental C. I. columns, 22ft high; the height from the ground floor to the centre of the roof being 64ft. The roof is covered with slates, glass, and lead.

The estimated cost of the Market Hall, complete with fittings, was nearly £20,000.

BRADFORD GOODS STATION.

The following list contains all the principal dimensions of the roof :—

	Ft.	in.
Span between walls of building	103	10
Height from rail level to top of arched rib or principal	62	2
Distance of main ribs apart cen. to cen.	20	0
Height from platform level to top of rib	60	2
Height from do. to bottom of rib ...	58	2
Depth of main rib over all, which is the same all round the arch	2	0
Radius of the arch, *i.e.*, from centre to intrados is about	52	0
The rib is built up of—		
Top and bottom flanges, all round arch, 9″×⅜″, rivetted to web and angle irons, with ¾″ rivets pitched about 4in. apart.		
Angle irons all round arch	3¾″×3¾″×⅜″	
Ornamental quartrefoil web plates ¼″ thick in No. 33 lengths, as shown in sketch, covered at each joint by 3½″×½″ joint plates, the two bottom plates on either side being left solid.	ton	cwt.qr.
The weight of one main rib is about...	6	16 1
Total weight of iron work in one bay of 20 feet, including rib, purlins, lantern or louvre frame, iron spandril rings, sash bars, &c., is about ...	15	7 2

NEW STREET STATION ROOF, BIRMINGHAM.

I will next instance the roof which covers New-street Station. It was completed in May, 1854; it is in one span, without intermediate supports, and up to that time was considerably larger than any roof previously constructed, but has now been eclipsed by the St. Pancras Station roof in the Euston-road, which has a span of 240 feet.

The span of the principals in the New-street Station roof varies from 211 to 191 feet. The ground being irregular on plan, and the space valuable, the outline of the roof was made to follow its boundary, and the roof is constructed tapering in two different proportions. The length of the several principals are consequently different, the greatest span being 211 feet at one end of the roof, and the span diminishing to 191 feet at the other end.

It will be seen from the drawing exhibited that the roof is supported on one side upon brick pilasters, projecting from the wall of the office buildings, and on the other side upon hollow cast iron columns, 2ft. diameter, and 5½ tons weight each, which are connected together by cast iron arched girders. The height of the springing of the principals is 33ft. above the level of the railway; the rise of the tie rod, which forms a curve, is 17ft. in the centre of the largest principal, and the depth of the curve principal is 23ft., making the rise of the main rib 40ft., and the total height is 84ft. to the top of the louvre in the centre of the roof.

The total weight of iron work raised was 1050 tons, the raising of which was effected without any accident to the crowd of people daily passing through the station. The number of squares measured on the plan was 1705, and, including 320 additional squares of ridge and furrow roofing, supported on bowstring trusses, and varying in span from 188 to 45 feet, the price was £1 8s. 9½d. per yard, or £32,274 for the whole. This information is obtained from Weale's book on the "Construction of Iron Roofs," which was published in 1859.

Another example is the roof over the London, Brighton, and South Coast Railway, Pimilco Station. This station was erected and completed in 1861, according to the designs of Mr. Jacomb Hood, Civil Engineer, by the Horsley Company, Tipton, contractors. The roof is 740ft. in length, and 243ft. in breadth, covering in all an area of 179,820 superficial feet. The length is composed of 13 spans of 50ft. each, at the north end one span of 53ft., and at the south end a span averaging 37ft. These spans are supported by main girders placed transversely, forming two spans of 124ft. 7in. and 117ft. 5in. respectively. These main girders are 10ft. 9in. deep, and rest on cast iron columns down the centre and the east side of the station, the girders on the western side being supported by the station wall.

The columns are 30ft. in height, and 1ft. 6in. in diameter, the shafts are fluted with ribbon bands running round them, the thickness of the metal being 1½in. at the thickest part; they are fixed at the bottom to a cast iron shoe secured to the stone foundation by Lewis bolts; the stone rests upon 9 piles braced together at the heads, and having a thickness of concrete filled in round them, the whole carrying a weight of 78 tons; the foliage on the capital is cast separately, and fastened on the column by screws. The total weight of the colums, including base and spandril brackets, is 6 tons 2 cwt.

The greatest span of the main girders is 124ft. 7in. The top boom or flange is formed by a wrought iron plate and a cast iron gutter, which is made to answer both purposes; the bottom boom is formed of flat bars 8in. wide. The struts and ties are formed as shown in the drawings, viz. :—of flat and T iron; the rivets are all ⅞in.; the different sections are proportional to the duty they have to perform; the sectional area of the bottom bar of girders is 15in. at centre, the tensile strain being 5·8 tons per sectional inch. The sectional area of top of girders (cast iron) is 47in., having a compressive strain of 1·8 tons per sectional inch; at the junction of the struts and ties, cast iron ornaments are secured by means of bolts. The total weight of each girder is 13 tons 10 cwt. The total weight distributed on the girder, including its own weight, is 61 tons. Between the columns are fixed ornamental longitudinal girders, forming a system of bracing. The main principals for the small spans are 12ft. 5½in. apart, and are formed of rafters of T iron 4″ × 4″ × ½″, with an inclination of 2 to 1, the lower end of the rafters being secured to a snug cast on the gutter. They each carry a distributed weight of 4·7 tons, and were tested to 9·15 tons. The struts are formed of 1½ × 2″ wrought iron piping, fitted with joints at the ends; the ties are round iron, and have a section proportional to the strain upon them. The alternate principals are T iron, 18ft. 10in. long × 4″ × 4″ × ⅜″, fixed at their lower end similarly to the main principals, the upper end being secured by bolts to a cast iron girder resting on the main principals.

The lower standards are cast iron of an H section, placed over each main principal, and bolted to the longitudinal cast-iron girder; another standard is placed upon the centres of the main principals, upon which a cast iron ridge piece is bolted with holes cast in it to receive the upper ends of the sash bars, the lower ends being fixed to a cast iron girder at the top of the side standards.

The sash bars are of a T form, 2in. high and ¼in. thick on the top, and 1in. × ⅜in. at bottom, the distance from centre to centre of the sash bars being 14·95in. Between the side standards are placed four louvre plates of galvanised iron ⅛in. thick, the ends being bolted to the standards by ⅜in. bolts. The bracing between the centre standards are of round iron ⅜in. diameter.

The louvres are glazed with glass ¼in. thick; the covering upon the rafters consists of the best Duchess slating, with a lap of 3in. They are secured to 1¼in. boarding by stout copper nails. The boarding is cut into lengths, so as to break

joint over the main principals only, and is ploughed and tongued with inch galvanised hoop iron. The boarding is fixed to ½in. deal curbson the backs of the main and intermediate principals, the curb being secured to the rafters by ⅜in. square-headed coach screws, placed 2in. apart on alternate sides of the T iron, and is chamfered on the underside and fitted into the longitudinal timbers (6in. × 3in.) at each end. The total weight of ironwork in roof, exclusive of columns and screens at south end, is 900 tons. Weight of ironwork in roof, exclusive of columns, ·5 tons per square. The cost, as per contract and extras, including columns and screen, was £3,0780, or about £17 2s. 7d. per square of 100ft. superficial.

I am indebted to Humber's "Record of Modern Engineering" for the foregoing information as to this roof.

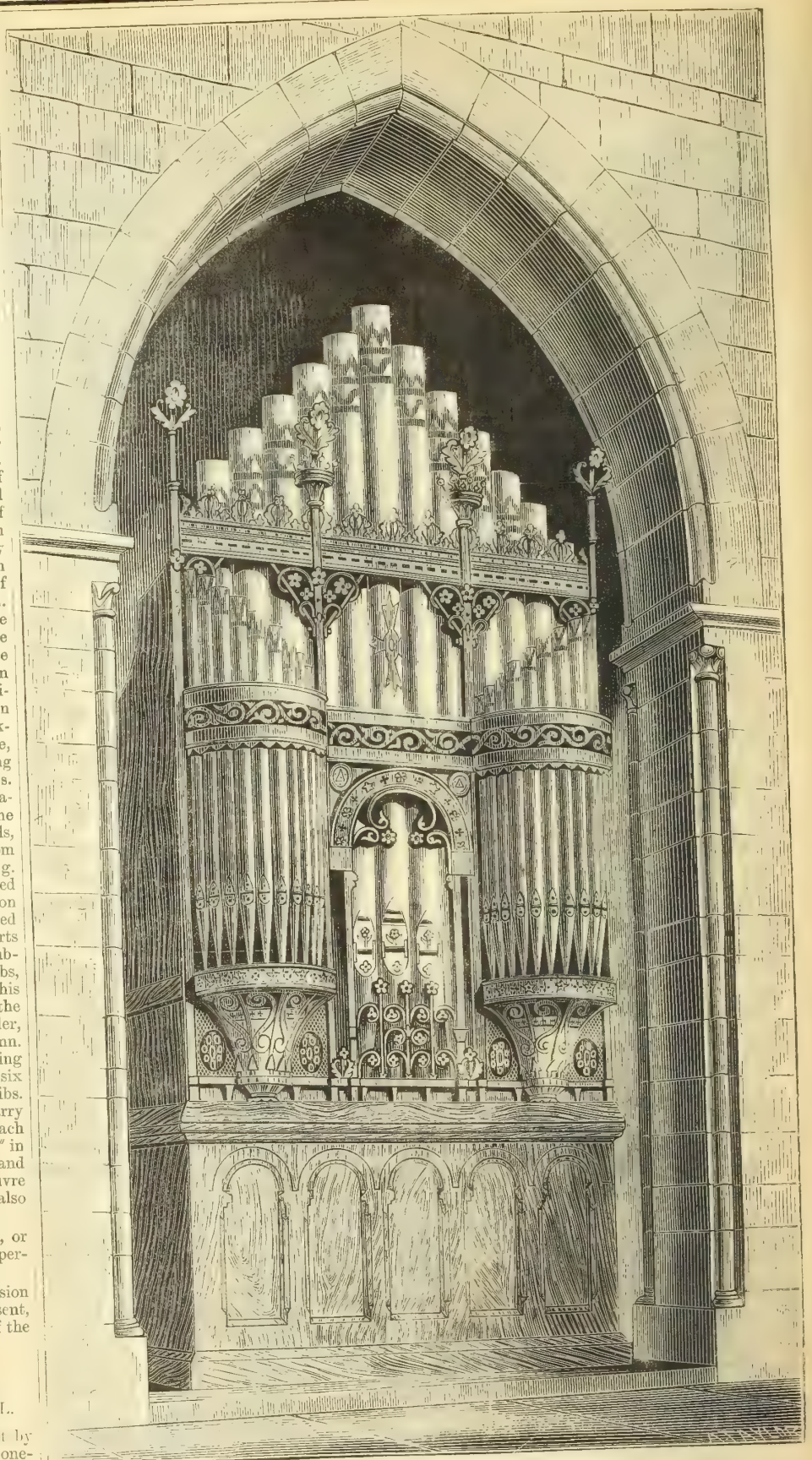
Adjoining the last roof is that belonging to the London, Chatham, and Dover, and Great Western Companies, which is known as the Victoria Station, Pimlico. It was erected from a design furnished by Mr. Fowler, C.E., and executed and erected under the superintendence of Mr. William Wilson, C.E. by the Horsley Company. It consists of two segmental arches of unequal spans, and of unequal lengths. As shown by the roof plan, one is 445ft. in length by 127ft. 4in. in breadth, and the other is 385ft. in length by by 129ft. in breadth. The difference in width was found necessary to avoid the disturbance of the then existing arrangements of the station. The height from the rails to the bottom of the gutter at the eaves, at the intersection of the ribs, is 36ft., and from the rails to the underside of the bottom flange, at the centre of the main ribs, is 63ft. 6in. Each of these sheds is longitudinally divided into bays of 35ft., by the main ribs springing on the outer sides from the brickwork of the station buildings on the one side, and the outer wall on the other, and resting in the centre on ornamental cast iron columns. These columns are bolted down to foundation plates, which are again bolted to a stone foundation, 2ft. below the level of the rails, and they serve as pipes to convey the water from the roof to the drains; they are each 38ft. long. The heads of the columns are connected together in the line of the roof by cast-iron elliptical girders, the spandrils of which are filled in with open scroll work. Each column supports a pair of main ribs, and the bay is again subdivided into three parts by two intermediate ribs, springing from the sides of the gutter. This gutter, which runs along the whole length of the roof, rests upon the top of the elliptical girder, and is provided with an outlet to each column. The outer gutters rest on the walls. The covering of each roof is supported by eight trussed and six trellised purlins which are bolted to the main ribs. On these purlins rest timber rafters, which carry the corrugated zinc covering. The top of each shed is ventilated by a louvre, which is 18′ 5″ in width, running throughout the whole length, and is lighted by means of the glass top of the louvre and by two skylights, one on each side, which also run the entire length of the roofs.

The total cost of these roofs was £24,250, or about £27 13s. 4d. per square of 100ft superficial of area covered.

At the conclusion of these remarks the discussion was taken up by the members and visitors present, and it will be resumed at the next meeting of the Society on the 26th inst.

ORGAN FOR BOMBAY CATHEDRAL.

THE organ illustrated herewith, was built by Messrs. Bishop and Starr, 250, Marylebone-road, London, for Bombay Cathedral.



Great Organ C C to G in alt. — 56 notes.

1.	Open diapason,	8ft.
2.	Bell,	8ft.
3.	Clarabella } 8ft. tone.	
4.	Stop Bass }	
5.	Principal,	4ft.
6.	Flute,	4ft. tone
7.	Twelfth,	2⅔ft. tone.
8.	Fifteenth,	2ft.
9.	Sesquialtra, 3 and 4 ranks.	
10.	Trumpet,	8ft.

Swell Organ, C C to G — 56 notes.

11.	Lieblich eedact,	16ft.
12.	Open diapason,	8ft.
13.	Stop diapason,	8ft. tone.
14.	Principal,	4ft.
15.	Fifteenth,	2ft.
16.	Cornopean,	8ft.
17.	Hautboy,	8ft.

Choir Organ, C C to G—56 notes.

18.	Dulciana,	8ft.
19.	German flute }	8ft. tone.
20.	Stop Bass. }	
21.	Keraulophon, to tenor C,	8ft.
22.	Principal,	4ft.
23.	Metal flute,	4ft. tone.
24.	Piccolo,	2ft.
25.	Cremona, to tenor C.	8ft. tone,

Pedal Organ, C C C to E—29 notes.

26.	Open bass, wood,	16ft.
27.	Open bass, metal,	16ft.
28.	Boardon, wood,	16ft. tone.
29.	Principal, metal,	8ft.
30.	Fifteenth, metal	4ft.
31.	Bombardon, wood and metal,	16ft.

Couplers.

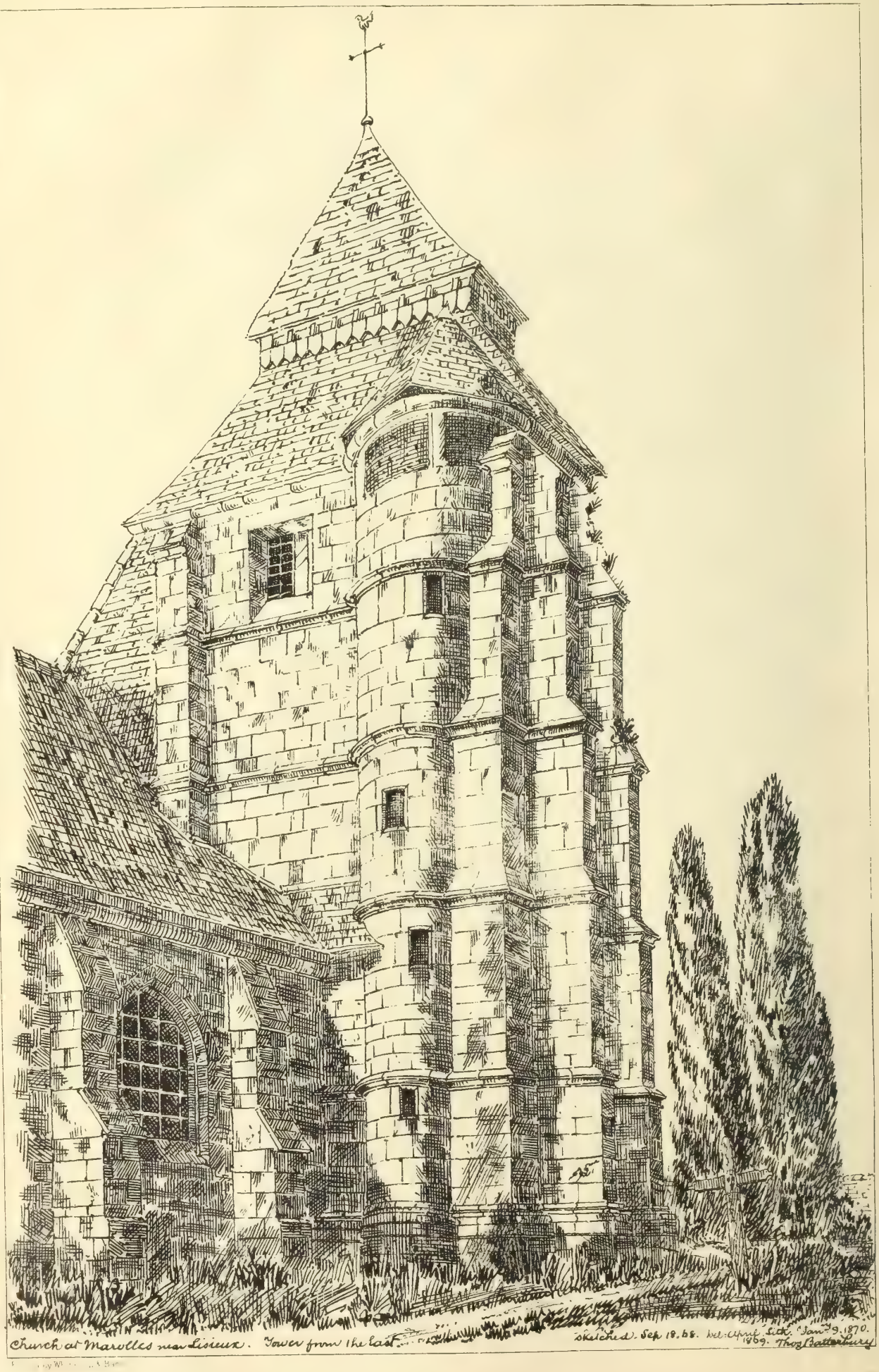
Great to pedals—swell to pedals.
Choir to pedals—swell to great.
Swell to choir—super swell to great.
Sub choir to great.

Total number of pipes, 1594.

Three composition pedals to great; 2 to choir; 2 to swell; 2 to pedals.

Two large pair of bellows with different pressures of wind.

The whole of the interior wood-work is of hard mahogany, to suit the climate of India, and the metal pipes of spotted metal. Every means has been adopted to render the organ safe from the attacks of the white ant. The organ has two fronts; one towards the choir, and the other to the aisle. The case is of massive oak, with a superstructure of iron work enriched with copper and brass. The design was furnished by T. Roger Smith, Esq., of the Strand, and the ornamental ironwork executed by Messrs. Peard and Jackson



Church at Marolles near Lisieux. Tower from the East.

Sketched. Sept 18. 68. Lith. Jan.y 9. 1870.
1869. Thos Battersbury

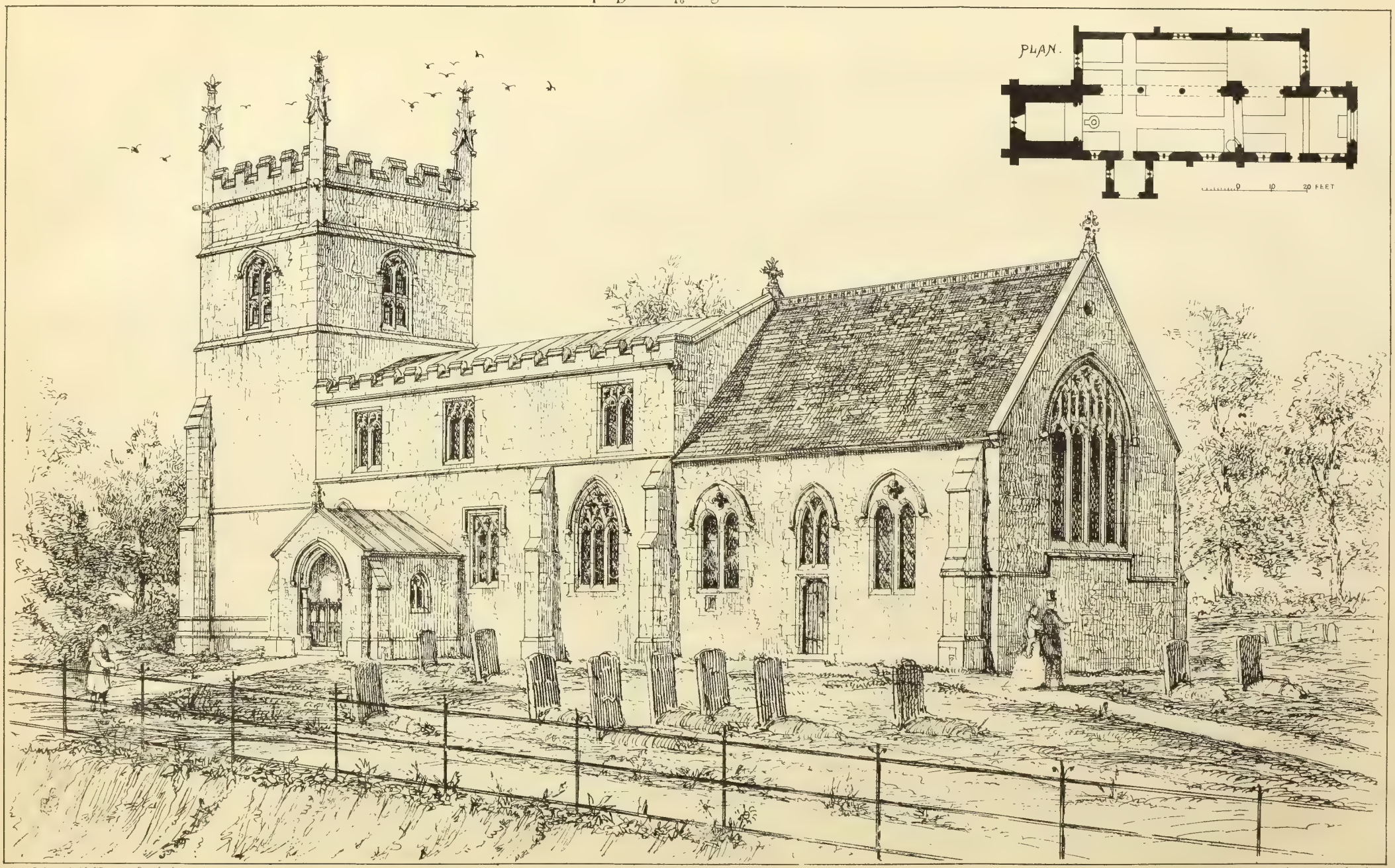
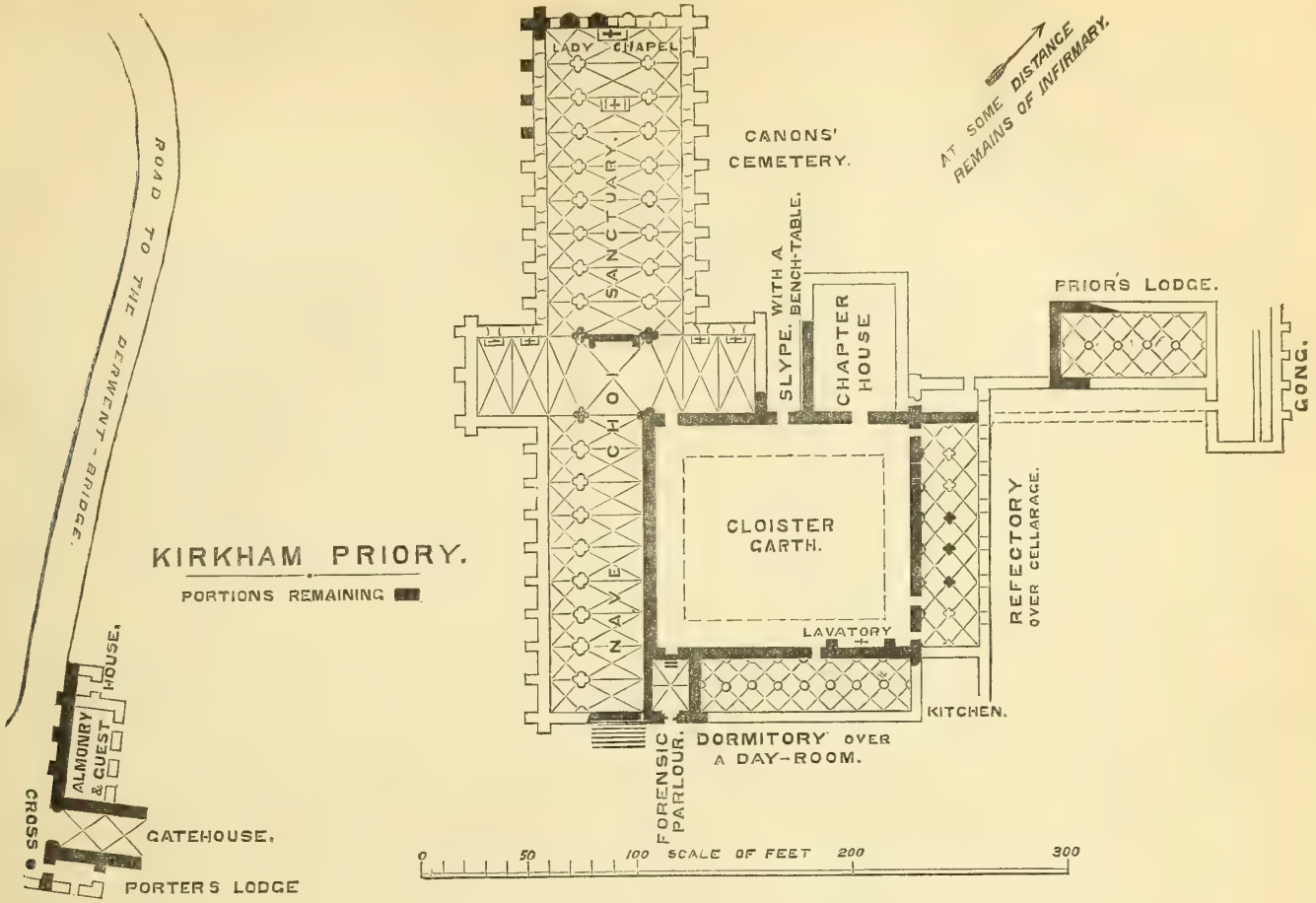


Photo-Lithographed by Whiteman & Bass London

William Smith Archt

Kimrote · Church._Leicestershire. RESTORED 1869.



KIRKHAM, OR AUSTIN CANONS' PRIORY.

THE Priory of the Holy Trinity, Kirkham, was founded in 1122, by Sir Walter LEspec, who led the English army at the battle of the Standard, and died in the Cistercian habit, as a memorial of a son (according to a legend, not narrated in his charter), who was killed whilst riding to Frithely, by being thrown against a stone cross, owing to his horse being startled by a wild boar. The splendid abbey of Rievaulx (1131), and that of Warden (1136), were erected by the same munificent friend of the church. Kirkham was occupied by Austin canons, who about a century after their settlement thought of removing to another site 12 miles eastward of Malton. When they gave up the project, they evidently addressed themselves to embellish their buildings. In point of position the priory challenges a place equal to Bolton, and second to Rievaulx. The broad rapid Derwent flows beneath the sloping meadow which forms its site, and on the opposite side rise beautifully wooded heights following the curves of the stream, which is crossed by a bridge of three arches, one of which is Early English. We possess no details of the first buildings, the earliest portion now remaining, the doorway of the refectory, is Norman, c. 1180.

The ruins consist of a gatehouse, portions of the almonry, guesthouse, and the porter's lodge; a fragment of the south nave-aisle, the steps to the great west door, the bases of the lantern, or bell tower, the walls of the south wing of the transept, and a small part of the east end of the minster, besides remains of the conventual buildings.

The gatehouse has been vaulted in two spans. The whole building may be referred originally to the latter part of the twelfth century, but the central part of the gateway is pure Decorated, and of the richest workmanship. The battlement has quatrefoiled ornament or panelling, and the north-west turret remains, its fellow having long since disappeared. A large pediment dying into the stonework crowns the lofty archway, which is without shafts. Below the cornice are the following arms on shields :—Clare, three chevrons, gu.; Plantagenet, the three lions of England; Ros, gu., three water bougets; and Vaux, chequey, or and gu. At each end is a statue. One is of S. Peter, the other may have been S. Paul. In the centre is an aureole containing a figure of our Lord in Doom, the dedications to the Holy Trinity and Christ being synonymous, as at Christ Church, Norwich, Bristol, and elsewhere. The two niches below contain images. One bears a huge staff, and possibly represents S. Christopher, in allusion to the neighbouring river. In the central niche under the pedimental canopy was, within memory, a rood, and the lateral trefoils contained angels with thuribles. Above the string course of the two windows are these arms :—L'Espec, gu., three wheels of five specs or spokes; Greystoke, barry of ten arg. and az., over all three chaplets gu. Four more are ranged two and two on either side of the pediment—1, a bend; 2 and 3, three water bougets; and 4, a cross fleury. Below them, on either side in niches, are S. George and the Dragon, and David and Goliah. The whole front, which is engraved in the Monasticon, is in two stages, the lower consisting of the arch, and the upper of five bays with crocketted canopies, the second and fourth being pierced with two-light windows trefoiled, with a star of six points, the cusps alternately pointed and round in the head, and a panelling of quatrefoils under each pane. The elevation is unique in design and beauty. The south front had formerly images of the Madonna and S. Catherine. Outside is the base of a cross raised on five steps. At the east side of the gateway is the almonry, a large vaulted room with a Decorated fireplace, and a guest chamber over it, which has a flat trefoil-headed door which opened into a gong, probably, as a drain has been found in connection with it. The chamber over the gateway, as at Thornton, probably accommodated the important guests, who were enabled to stand in the actual gatehall before admission, being sheltered by the vaulting overhead, while the north side was closed by the gates, and the south opened into the minster-court beyond. At the west side was the porter's lodge, a small vaulted room with a chamber over it, possibly used as a tribunal or court house. At a little distance to the south-west, below the road, is an archway, for the conveyance of stores, as tradition says.

Passing across the open ground, the first object of interest is the fine ascent of stairs which once led into the west doorway of the Priory Church. On the south is the basement of a tower, forming an entrance to the cloisters, as at Lanercost and Newstead, used by the porter, with sexpartite vaulting, and the door way which led from the dormitory into the triforium of the nave. At Christ Church, Hants, the stairs lead down in a similar position to the floor of the aisle. As in many other instances, as Hexham, Ulverscroft, Brinkburne, Lanercost, Newstead, and Bolton, there was no south aisle. At Dorchester there was no north aisle to the nave. The reason of this peculiar arrangement has yet to be learned, since the Austin canons erected aisles at Furness, S. Bartholomew's, Smithfield, Repton, Christ Church, Hants, Waltham, Haughmond, Colchester, S. Germain's, Bridlington, Cartmel, Dunstable, Thornton, Bristol, Carlisle, Oxford, Worksop, Llanthony, Walsingham, and S. Mary Overie. Very possibly it was in several of these former instances an economical arrangement in remote and thinly-populated districts. Lilleshal was aisleless throughout. Still further southward is a wall, with an internal arcading on its eastern face, which formed one side of the substructure of the dormitory, which was vaulted and divided into two alleys by a range of seven pillars. This no doubt formed, from its ornamentation, a day-room or calefactory, as it opened on a beautiful landscape towards the Derwent, and would be well lighted for the use of the writers. Remains of the cellarage under the butteries of the hall may be traced in continuation with this wall running south.

The only other portions of the claustral building which require to be described are the refectory and lavatory. The substructure of the former consisted of six pillars, some of which may be traced. The east and north walls of the hall remain. The windows must have been on the south and west. The noble Norman doorway in the north wall is exceedingly fine, and is engraved in the Glossary. In the actual angle of the cloister may be traced the door for the admission of stores into the cellarage, and adjoining it, on the west wall, in two deep, arched recesses, is the lavatory. The inner walls have dumb tracery of three cinquefoiled Early Decorated arches, with cinquefoils in the lateral spandrels, and an ornament of six leaves in the head. Between the outer arches is a square stone, with a voided lozenge having ends crossed at right angles. The places for the leaden pipes and spouts are still distinctly marked. In each case, about midheight above the trough, a pipe was laid transversely, and pierced so as to distribute through several holes distinct streams of water, for the convenience of the canons when washing before hall time. Northward of them is a door to the dormitory, and on the other side a second open arch.

From the slope of the ground, stairs must have been freely used, so as to give a magnificent elevation to the high altar, as on a smaller scale may be seen in the remarkable church of Ashburnham, erected after the Restoration. At the north-east angle are portions of two doorways, which led into the cloister severally from the nave and south arm of the transept. The cloister itself had only a pentice, or a covered way of timbered work. The grand bases of the four lantern pillars suggest a superb central tower—the glory of a minster which must have been at least 300ft. in length, the nave alone measuring 130ft. Against the steeply rising ground eastward is sharply outlined the fragment of the east end, one solitary lancet of the triplet, which once closed the minster, with portions of the springing of the arch of the aisle-window, and two buttresses; these, with a few prints upon the grass of the northern buttresses of the Lady Chapel and aisle, are all that remains of a lovely choir of Early English date. Under the east window is a grave stone with a floriated cross. Many of the De Ros family were buried near the high altar. The transept had two chapels in each wing. Between the south front of the transept and the site of the chapter house, which was Early English, and measured 80ft. by 30ft., is a small slype with a bench table as at Thornton, which was used by the canons when waiting the opening of the daily chapter, and as a summer parlour. It may also have contained the aumbry for the cloister library. Southward of the chapter house there was formerly a passage communicating by a doorway in the cloister wall and leading to the prior's lodge, still in existence; it was composed of a vaulted substructure, which supported on four pillars a solar above; and also of another larger chamber running east and west, probably a gong. To the extreme east a few portions of the infirmary, but the mere shell has been preserve, embracing the east and west walls, and the north front.

It is unnecessary to allude to the local tale which connects the destruction of the minster and buildings with a weird legend. At one time it seems a chapel was erected out of the ruins in the space between the gatehouse and the Priory Church, after the Reformation, but like the ancient seven bells in the tower, and an older archway for the transmission of fuel and provisions, which about a century since stood higher up the hill side, it has totally disappeared. A Perpendicular font has been removed to Acomb.

CORRIGENDA.—In the plan of Fountains, illustrating my description of that Abbey, in Jan 7, for "nine alters" read "nine altars," and for "singing choir" read "original choir."

M. E. C. WALCOTT.

NOTICES OF PUBLICATIONS.

A History of Lichfield Cathedral. By J. B. STONE, F.G.S., &c. London: Longmans, Green, and Co.

THE recent restoration of Lichfield Cathedral has enhanced the interest felt by men of taste in one of the noblest cathedrals of the midland counties. The work before us, though professing to be no more than a guide to visitors to the building, is really a reliable history, and contains a tolerably good account of the architecture of the cathedral. It is well printed and put together, and contains some very fair photographs of various parts of the building.

The original Norman Church was founded either by Robert de Lymesey, 1086—1121, or by Roger de Clinton, 1129—1148—more probably by the latter.

A large chapel was added before the end of the century at the end of the older Norman apse; but these buildings gradually disappeared as the reconstruction proceeded. Professor Willis suggests the following dates and probable order of erection of the various parts: Lower part of three westernmost bays of choir, with sacristy on south side, 1200; south transept, 1220; north transept and chapter-house, 1240; nave, 1250; west point, 1275; Lady Chapel, 1300; Presbytery, 1325. The damage done to the building in the civil wars of the seventeenth century is well known. Equally well known, probably—the story of the death of the fanatical Lord Brook, who was shot in the forehead while beseiging the Cathedral on S. Chad's day, and of whom Archbishop Laud said "that as he asked of God a sign" (as to the righteousness of the work he was doing) "so God gave him one, signing him in the forehead, and that with such a mark as he is likely to be known by to all posterity." We need not follow Mr. Stone through his account of the restoration. The details of that work are well known to our readers; but to those who need a summary of its progress and completion we recommend Mr. Stone's book.

Gutch's Literary and Scientific Register and Almanack for 1870. London: W. Stevens, 421, Strand.

THE twenty-ninth annual issue of this most useful little pocket-book is, as usual, full of information of interest to all classes. Commerce, art, science, and Divinity are all catered for. Specially useful to our readers will be found the information given under "Architecture." Professor Cockerell's chronological table of architects and their buildings is given; together with tables of dimensions of the principal cathedrals, monuments, &c., throughout the world.

The British Almanack and Companion for 1870. London: Stationers' Company.

THIS familiar yearly visitor maintains its appearance and character. Its value is chiefly due to the papers on various subjects which the "Companion" contains, and which usually deal with the principal events of the past year. An interesting account of the National Gallery is given, and, as a matter of course, the history of the Suez Canal.

The article on "Architecture and Public Improvements" is contributed by Mr. James Thorne, and is illustrated by several woodcuts—among others the London University and the new Chapel of S. John's College, Cambridge. We are informed by Mr. James Thorne that, after "a series of alternate victories and defeats in the 'Battle of the Styles,'" there has "ensued a calm," and that either "from weariness or exhaustion, or by common consent, Italians, Greeks, and Goths have separated, resting awhile in a sort of armed peace, watching each other's movement." This is one way of putting the matter—and doubtless an agreeable one to the "Greeks." We fail to recognise anything like peace; the conflict of styles is being fought daily, and the only change observable in the attitude of the Goths is that they are quite as willing to fight each other as to combat Italians or Greeks.

The delay in the erection of the Law Courts is commented on. Mr. Lowe is commended for his interference; and Mr. Street, who, it is patronisingly added, is "an excellent architect," is advised to "reconsider his design," "to hit upon something more appropriate and noble," and to "hold himself well repaid for the delay and trouble in escaping from having his name for ever linked with what would have been, perhaps, the biggest, but, beyond dispute, the ugliest tower in existence." We trust Mr. Street is thankful, and will not fail to send for the reviewer, should the Government after all change the site or the design.

Atchley's Builder's Price Book for 1870. Atchley and Co., 106, Great Russell-street, London, W.C.

THIS, the first of the price books for 1870 that has reached us, is one of the most reliable. We especially notice a very useful feature—viz., a description, by Mr. William Richardson, of the marks on timber, alphabetically arranged, likely to prove of very considerable service. There is also a paper, by Mr. Francis Campin, "On the Application of Iron to Building Purposes," in which the author examines the circumstances under which cast and wrought-iron girders are subject to strains, and sets forth succinctly the rules which may be relied on in general practice. Any information of this kind coming from a practical source is welcome, and we believe Mr. Campin fully qualified to give it. A paper on "Builders' and Surveyors' Calculations," by Mr. Alfred C. Beaton, contains some practical rules for securing a complete valuation of builders' work.

Vegetable Physiology in a series of Easy Lessons. By EDWIN LANKESTER, M.D., F.R.S. London: Cassell, Petter, and Galpin.

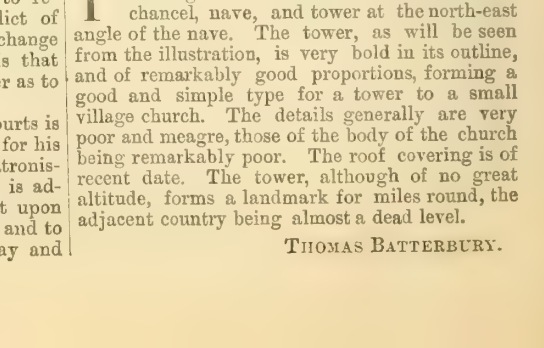
AN elaborate and yet easily comprehended inquiry into the component parts of vegetable forms, and their duties in the great work of reproduction. A capital book for elder scholars, and yet one that should by no means be exclusively confined to their use.

Prison Discipline, with some Suggestions for its Improvement. By ANGUS CROLL, J.P., London. 1870.

THIS pamphlet, which is addressed in the form of a letter to Mr. Henry Pownall, the Chairman of the Middlesex Magistrates, embodies the author's ideas of prison discipline. He truly says that the present system puts the convicted felon into a position utterly unlike his outdoor life, and affords no training or discipline for that mode of life when it is again recommenced. He recommends that prisoners should be grouped according to their trades and professions, each following his own proper calling, and receiving better or worse accommodation and food, according to his earnings. That in the case of unskilled labourers their energies should be applied to the cultivation of land—to be tilled by spade husbandry and fertilised by prison sewage. Mr. Croll is not, we think, the first who has recommended such a course. It might work well in some instances, but could not, so far as we see, be applied with any degree of thoroughness. Such artisans as tailors, shoemakers, and the like, might, of course, be employed in prison in their own trades. They need comparatively little co-operation or supervision, but how are jewellers, weavers, engineers, compositors, and other members of trades who work daily, when out of prison in large bodies, and depend on the co-operation of labour for the success of their work, to be employed while under sentence?—unless, indeed, Mr. Croll proposes to lend them out on the Colonial ticket system. Mr. Croll admits that exceptional cases might arise, but, we fear, the majority of cases would present the difficulties he apparently expects only occasionally to encounter.

THE BUILDING NEWS SKETCH BOOK. No. 15.

TOWER OF MAROLLES CHURCH, NEAR LISIEUX.



THE village church of Marolles consists of a chancel, nave, and tower at the north-east angle of the nave. The tower, as will be seen from the illustration, is very bold in its outline, and of remarkably good proportions, forming a good and simple type for a tower to a small village church. The details generally are very poor and meagre, those of the body of the church being remarkably poor. The roof covering is of recent date. The tower, although of no great altitude, forms a landmark for miles round, the adjacent country being almost a dead level.

THOMAS BATTERBURY.

Furniture & Decoration.

MURAL OR MONUMENTAL DECORATION.*

SECOND NOTICE.

ALTHOUGH Mr. Thomas recommends fresco painting as the best method of executing works of art for important public buildings, he seems to have a strong leaning to encaustic painting as well. He says, "It will probably be preferred by many in this country, as it promises a somewhat richer range of colour, a more powerful effect, and to be a less encumbered process." We ourselves should think it particularly suitable for the decoration of halls and rooms in private mansions. As its name signifies, it is "executed by fire," and though wax be the vehicle, no painting with that material can properly be called encaustic unless heat be applied in the process; yet Mr. Thomas looks forward to the possibility that the advance in chemical science may render it unnecessary to use heat at all in painting with that material.

Encaustic painting was extensively used by the ancients, even for painting their ships, and Mr. Thomas has collected much information on the subject; but as none of their works have been preserved, nor any distinct description of the process they used, we cannot be sure that any with which we are acquainted are identical with theirs. The Chevalier Lorgna has published his investigations in a tract called "Un Discorso Sulla Cera Punica," and has described experiments made by the Italian painter, Signor Antonio Paccheri, in the apartments of the Count Giovani Batista Gasola; and Count Gaylus, a member of the French Academy, many years since, after trying all the different possible ways of painting in wax, hit on a simple method, in which a head of Minerva was painted, and much admired at the time. He rubbed cloth or wood with beeswax, and after rubbing it over with chalk or whiting, laid on colours mixed with water, and when the picture was dry put it before a fire, whereby the wax melted and absorbed the colours. The effect produced was singular, and the picture without gloss, and the colours would bear washing and were not liable to injury.

"Encaustic painting," to quote Mr Thomas, "is said to be susceptible of all the freedom and delicacy of any other whatsoever; you may leave off or cherish your work at pleasure; you cannot fatigue your colour, nor are you subject to the inconvenience attending oil-painting—of waiting till it is dry. All the effect and sweetness of oil-painting (it is said) may be obtained. The colours are not liable to fade or change; no damp can affect it, no corrosive will hurt it; nor can the colours crack and fall in shivers from the canvas."

As most colours acquire a deeper hue when moistened, and some deeper still when mixed with wax, a guide for retouching is necessary, as in fresco. When the picture is wet, it appears nearly what it will be when fixed; when dry it looks like distemper. It is fixed by heat in small works, by placing them before the fire, but by braziers in those on walls. There is no danger in applying heat over and over again, but this must be done moderately and gradually, so that the picture can easily be retouched.

The characteristics of encaustic painting are thus summed up by our author:—

"First: The colours have all the airiness of water-colours combined with the strength of oil, thus escaping the defects of both.

"Second: A picture may be looked at in any light, the colours are fresh and vivacious without being glaring.

"Third: The colours are firm without being brittle, and scratches may be easily repaired."

Of Mosaic, the method of executing which is familiar to most of our readers, and upon which therefore we need not dilate, Mr. Thomas remarks "that it should only be employed in large public buildings, and at distances sufficiently remote from the spectator's eye, for it is only fit to render designs made with reference to its technical limitations and incompleteness. But as a counterbalance to its imperfections, it is perhaps the most durable of all the methods of mural decoration."

Mr. Thomas does not give much information himself as to the practice of mosaic, although he makes some valuable and pertinent remarks with regard to it. He quotes freely from Sir M. D. Wyatt and Mr. Layard, who are unquestionably good authorities on the subject in many respects, but with whom we are disposed to differ in others. The truth is that those who have laudably interested themselves in the modern revival of this art are rather too complacent as to the results of their efforts, and compose too much a mutual admiration society; whereas all the experiments as yet made have achieved but a small modicum of success. Neither the works at South Kensington, the reredos in Westminster Abbey, or any other examples with which we are acquainted, deserve the commendations bestowed upon them. The reasons for this want of success are that, as far as regards the execution of mosaic, it has fallen too much into the hands of manufacturers of the same class as those that fabricate painted windows. Nor can much good be expected in either of these handicrafts until artists themselves execute as well as design their works, or at least are allowed to control them. That mosaic is a durable and excellent material for executing works of art to be placed at considerable distances from the eye is certain, but the tesseræ should be fixed in their place, as colours are on canvas, by the hand of an artist, or it is hopeless to expect an artistic result better than that of copies of pictures made in Gobelin, tapestry or worsted work.

The method at present adopted of imitating cartoons by the arrangement of the tesseræ with their faces downwards is a fatal one, as preventing altogether the freedom which is essential to all works of art; it may, indeed, be economical, but renders the so-called picture in reality valueless.

The following remark, quoted—"it is better to spend time, thought, and money in getting really first-rate cartoons, than in endeavouring to bring the tesseræ to fine joints or microscopic minuteness"—would lead one to think that though preference is given to the former quality, the latter is also a desirable one, and as Mr. Thomas adds no qualifying opinion of his own, we feel bound to assert strongly that, on the contrary, it is so undesirable that, even if practicable, it should be avoided, and we cannot join in this opinion, further given, "that it is highly gratifying to observe the degree of judgment with which the mosaicist has emphasised the designer's intention of the jointing in the Russian, Salviati's, and the South Kensington specimens." If we remember rightly, the Russian work of this class, exhibited in 1862, was much the most satisfactory in this respect, but with regard to the others named, the jointing is far too fine and regular, and the tesseræ too even in colour, so that the backgrounds, for instance, look as if they might just as well have been gilt and scored with lines as composed of separate pieces, and there seems no good reason for breaking up the ceramic cakes at all if the object of the designer is afterwards to be devoted to the concealment of the fact. The effect of the ancient specimens depends greatly upon the very coarseness and irregularity of the jointing, and the evident variety throughout in the colours of the tesseræ, consequent upon their being fixed from the front by the hand of an artist. We regret also that Mr. Thomas, in recounting the names of the most distinguished men who have used this material, and their extant works, does not give any opinion of his own as to their relative merits. We should have liked, for instance, that his readers should have been told the differences in the character of the early and late works in that museum of mosaic—S. Mark's Church, Venice; and that it had been pointed out to them that the former alone show the proper treatment of design for this peculiar material, and that the latter, though by the hands of eminent artists in other methods of painting, are but grievous mistakes in this; that they fail utterly in architectonic adaptation as decorations; and that, however meritorious in many respects, they absolutely disfigure the building they were intended to adorn. We feel bound the more strongly and clearly to give expression to the above conviction, because the tendency in the present experimental work in S. Paul's Cathedral and elsewhere is to err in the same direction; and we are threatened to be as equally inundated with repetitions of this blundering of the Renaissance artists as we are with indifferent manufactures in coloured glass. If Mr. Thomas's work reaches, as we hope it may, another and many other editions, we trust he will give more of his personal consideration to the subject of mosaic, and treat us less to quotations from other authors, however distinguished, and more to his own deductions and experience.

Oil Painting will, from our point of view, occupy less of our attention, since to its invention is attributed the decline of that mural decoration we desire to advocate. "Previously," says our author, "painters were chiefly occupied in decorating the walls of public buildings, and were restrained in the treatment and effect of their works within well-defined limits by architectonic conditions and method of execution. The introduction of oil-painting, however, gradually changed the whole character of pictorial art; for it rendered the painter independent of the architect, and released him from these limitations"; and further, he remarks, with truth, "The more the influence of architecture over the painter waned, the greater became the excesses of the painter in composition, colour and effect, till at last the variety of ways in which oil-colours could be used dissipated all system in their use, as well as any common tendency and grand aim in art"; and he argues in the very direction of our wishes, that "a return to mural painting and the simple style of design and execution which it involves would be highly beneficial, and would not only raise the aim and style of pictorial art, but improve the very practise of oil-painting itself."

Water-glass is the subject to which the last chapter is devoted. Mr. Thomas himself seems to have had a considerable share in the labour, and should therefore reap an equivalent one in the honour of the invention or development of this process, which promises valuable results, but of which time is needed to prove the ultimate success. Our climate, he acknowledges, notwithstanding his previous commendations of fresco painting, is not very favourable to it, and when asking if there is no means of guarding against the destruction of such works of art as the picture on the Isar Gate at Munich, which is in a deplorable condition, says that he knows of no other remedy but the water-glass and the water-glass mortar—the first to fix the colours and the ground, and the latter to fill up cracks and cavities, that they may be repainted, and he thinks that for *monumental painting* it rivals and will eventually supersede fresco-painting.

We have not space to follow the description of this process, which is elaborately given in the work, together with the interesting report upon it by David Maclise, Esq., R.A., which is added in the appendix, and which is further swelled by a copious list, useful for reference, of works upon painting, of painters, and of the principal existing mural decorations. From this list the author, in some valuable concluding remarks, says it appears that "Fresco was preferred by the great

* "Mural or Monumental Decoration." By W. CAVE THOMAS.

masters for mural decoration, though mosaic, oil, and distemper were well understood. This preference for fresco in the execution of monumental works in the halcyon days of art was therefore deliberate, and with the conviction that it was best adapted to the purpose. If fresco is susceptible of injury from damp walls, distemper is much more so; under such conditions the latter soon perishes, and it is stated in the Reports of the Royal Commission on the Fine Arts that many frescoes have long survived the retouchings which have been made in tempera. Nothwithstanding the durability of mosaic, and the preservation of this art in Italy, it was never a favourite method with the great painters and architects, and when adopted it was sparingly and within well-defined limits. The water-glass process may prove superior to all others, but till the invention of this process, fresco had the testimony of the great masters and the centuries in its favour. J. P. S.

THE DWELLINGS OF THE LONDON POOR.

THERE appeared in the columns of a contemporary, a short time back, an elaborate account of the Peabody Trustees' Dwellings and the buildings of the Improved Industrial Dwellings Company (Sir S. Waterlow's dwellings). Having had some little experience in providing dwellings of this class at a moderate cost, I venture to send you a comparative analysis of the accommodation, cost, rental, &c., of these buildings, the Society of Arts' dwellings for the labouring classes, and plans prepared by me some time ago for dwellings of the poor of Liverpool. The latter, although not adopted, proved, upon examination by the borough engineer, to be the most economical from upwards of 70 designs.

The buildings of the Improved Industrial Dwellings Company are six stories high, having in some cases basement dwellings, and appear to provide 653 distinct dwellings—294 with three rooms, scullery, &c., and 359 having two rooms, scullery, &c.—in all 1600 rooms, exclusive of sculleries; the cost of the former being £162 3s. 11d., and the latter £108 2s. 6¾d. per dwelling, or at the rate of £55 1s. 3d. per room, showing a total expenditure of £86,533 for buildings. The average rent of the larger dwelling is 6s. 10d., and of the smaller one 5s. 1½d. per week. The average rent for both dwellings is 6s. 1¾d., and for each room 2s. 6d. per week. At these rates, when fully let, the gross rental would amount to £10,462 per annum, and the gross return 12 per cent.

The Peabody Trustees' buildings at Islington, Shadwell, and Spitalfields provide about 404 distinct dwellings, comprising one, two, and three rooms respectively, containing in all 861 rooms, at an average cost of £242 11s. per dwelling, or £113 16s. 3d. per room, the total cost amounting to £97,994 for buildings. The average rent of each dwelling is 3s. 11d., and of each room 1s. 10d. per week; the gross rental when fully let would, therefore, be about £4104 2s. per annum, and the gross return 4¼ per cent.

The plans for the dwellings of the poor of Liverpool, six stories high, without basement dwellings, contain 168 distinct dwellings, comprised in three classes—48 class 1, with four rooms, scullery, &.; 48 class 2, with three rooms, scullery, &c.,; and 72 class 3, with two rooms, scullery, &c.; in all 480 rooms, exclusive of sculleries, the cost of class 1 being £179 16s.; class 2, £148 7s.; and class 3, £98 18s. per dwelling, or at the rate of £49 9s. per room, showing a total cost of £23,736 for buildings. The rent of the dwelling class 1 is 6s. 6d.; class 2, 4s. 10d.; and class 3, 3s. 3d. per week. The average rent being about 4s., and for each room 1s. 7½d. per week, the gross rental, if fully let, would amount to £2028 16s. per annum, showing a gross return of 8½ per cent.

The Society of Arts' prize dwellings for labourers have been erected under my direction in upwards of nine counties; they are built semi-detached, each dwelling containing four rooms and scullery, with pantry, fuel place, piggery, privy, cesspit, and ashpit, washing coppers, baking ovens, fixtures and fittings, well, rainwater tank, drainage, &c.; complete, their average cost has been £131 10s. per dwelling, or £32 17s. 6d, per room, exclusive of scullery. The average rent per dwelling is about 1s. 9d. per week, or 5¼d. per room per week, showing a gross rental of £4 11s. per annum, and a gross return of nearly 3½ per cent.

From this statement it will be observed that the Society of Arts' dwellings are the cheapest, and, while containing one room more than the company's largest dwellings, cost £31 13s. 11d. less. Assuming the company's larger dwelling to contain an equal amount of accommodation, the cost would then be about £216 per dwelling built in tenements; whereas the Society of Arts' dwellings have cost but £131 10s., built semi-detached; and although the former may perhaps be somewhat more substantially built than the latter, and a considerable difference exists between the cost of buildings in London and the country, yet it must be remembered that semi-detached buildings have to bear the whole cost of the structure complete, while tenement dwellings have to bear only a proportionate cost thereof.

The Peabody Trustees' buildings are the most expensive, both per room and dwelling. This is doubtless accounted for by reason of the space lost in long corridors and passages. Had there been a greater number of staircases and no corridors or passages, the cost would have borne a more favourable comparison. The company's dwellings are not free from this objection, as there is considerable space lost in passages and open galleries on each floor. It will be seen that the plans for the Liverpool dwellings have a proper number of staircases, with the dwellings entering off the stair landings, thereby utilising all available space and reducing the traffic of the stairs. The established cost of these buildings, whether calculated at per room or dwelling, is also much lower than the company's or the Peabody Trustees' dwellings.

With reference to the rentals, it will be seen that in the company's largest dwellings, containing three rooms, scullery, &c., the working-man pays an average rent of 6s. 10d. per week, whereas in the Society of Arts' dwellings, containing four rooms and scullery, &c., the labourer pays but 1s. 9d. per week. The working-man in London would, therefore, seem to pay four times as much rent for a smaller dwelling compared with that of a labourer in the country.

To enable the working-man with a family to pay such a high rent, one of the rooms is not unfrequently let to a lodger, a privilege, I believe, permitted in certain of the company's dwellings; and as the largest of these contain but a limited extent of sleeping room, this can hardly be done having proper regard to decency. The rates fixed by the Peabody Trustees and the rating of the Liverpool plans appear to be moderate, and within the limits of a working-man's means, providing for a proper number of sleeping apartments, essentially necessary to all dwellings.

Trusting you will have the goodness to insert this letter, I have the honour to be, Sir, your most obedient servant, JOHN BIRCH.

From the Times, January 20.

SCHOOLS OF ART.

NOTTINGHAM.—The prizes won by students in this school were distributed on Friday evening, the 7th inst., by Mr. Justice Mellor, Alderman Birkin in the chair. His lordship, before presenting the prizes, addressed the students and visitors at some length. Addresses were also given by Lord Belper, Vice-Chancellor James, and Mr. Mundella, M.P., the latter gentleman paying a high tribute to the abilities of the master of the school (Mr. Rawle). From some statistics read by the chairman it appears that Nottingham has a larger number of students attending its School of Art than any other town in the kingdom in proportion to its population. There are 417 students, chiefly of the artisan class. In the Government examinations in drawing held last March, Nottingham obtained a greater number of prizes than any other school in the United Kingdom—London alone excepted. The highest number of prizes obtained are as follows:—Head Schools, South Kensington Museum, London, 76; Nottingham, 38; Bristol, 37; Dublin, 34; Bath, 30; Leeds, 29; Glasgow, 28; Edinburgh, 27; Dundee, 27; Birmingham, 25. So that for two years running Nottingham has obtained the highest number of prizes. Government offers every year for competition 10 gold medals, 20 silver medals, and 50 bronze medals, total 80. Nottingham school this year obtained seven of them, namely, one gold, two silver, and four bronze, and also four Queen's prizes. Nottingham has obtained the highest number of medals of any provincial school in the United Kingdom. The schools which have obtained the greatest number of medals rank as follows:—Nottingham, 7; Dublin, 5; Edinburgh, 4; Manchester, 4; Coventry, 4; Sheffield, 3; and Glasgow, 2. Nottingham also obtained 14 extra Government prizes of books, &c., and 21 free studentships. The Council of the Royal Academy of London offered thirty season tickets to be distributed amongst the thirty most advanced students in the kingdom; of these Nottingham obtained three. Only one other provincial school obtained as many, viz., Dublin. In the annual report of the Governmental Examiners, just published, the Nottingham School of Art has received special notice, as follows:—"We have again to express regret that the study of elementary design, by the filling of geometric forms with ornamental details derived from the analysis of flowers and foliage, has been attempted in but few schools. It may be observed that the local School of Art of Nottingham, in which this is best done, is also the most successful in applied designs. In an extensive competition of good designs for lace, &c., we found an opportunity for numerous awards, which were called for by the successful manner of treating the floral forms, judiciously selected as the materials for most of the designs for these delicate fabrics."

PROPOSED DRAWING CLASSES IN THE THAMES VALLEY.—A general meeting of schoolmasters and others was held on Saturday, at the Norbiton National Schools, for the purpose of considering what steps could be taken to establish classes for teaching science and drawing in the Thames Valley. Mr. Buckmaster explained the regulations under which such classes could be established. He insisted on the educational value of science and art teaching, as compared with some other subjects. A short discussion followed, when it was resolved—"That the scheme of the Science and Art Department for promoting instruction in drawing and science was well worthy the consideration of teachers and those interested in adult education."

EDINBURGH.—On Thursday week a meeting was held for the purpose of delivering the prizes awarded to students of the School of Art for the year 1868-9, and before the commencement of the proceedings, half-an-hour was pleasantly occupied in examining the competitive drawings and models which were displayed. The chair was taken by Sir William Stirling Maxwell, who was accompanied to the platform by Lord Colonsay, the Lord Justice-General, the Lord Justice-Clerk, Lord Ardmillan, Lord Jerviswoode, and others. According to the report—the number of students who have been under instruction in the year 1868-69 at the central school of the School of Art, Edinburgh, is 684, which is the largest number on record, being 37 more than in the previous year, which had been the highest in number up to that time. The increase is in the male school, there having been 47 more students in that school than in the previous year. The female school shows a slight decrease of 10 students upon the previous year. The schools in the city which have received drawing instruction during the year have been:—S. George's Day School, Dr. Andrew Thomson's School, Newington Free Church School, Deaf and Dumb Institution, Orphan Hospital, Free Church Training College, Free Church Normal School; and the number of students taught in them has been 1261, being 204 more than in the preceding year. Taking the central school and the outside schools together, the total number of students under instruction in the year, through the agency of the School of Art, is 1945.

LUMBER.—It is stated that the lumber trade of Michigan in 1869 has reached the value of thirty-four millions of dollars. It is estimated that up to the close of 1869 there have been manufactured in Michigan 7,200,000,000 feet of lumber, and that to obtain this quantity there have been stripped 1,950,000 acres, or 3,000 square miles of pine land. It is calculated that 4,000,000 acres of land still remain unstripped which will yield 15,000,000,000 of feet of lumber The total value of the future product in lumber shingles, lath, &c., is placed at 300,000,000 dollars, and it is thought that fifteen or twenty years will be required to cut and send to market the trees now standing.

The Surveyor.

ON THE ENFRANCHISEMENT OF COPYHOLDS OF INHERITANCE.*

(*Concluded from p.* 34.)

WITH reference to the ordinary case of copyholds subject to fine arbitrary on admission after death or alienation, Mr. Rouse points out (p. 85), that the way to calculate the value of the fines "is to find on each manor the average interval which has elapsed between changes of tenants, for such a period of time as will give a fair average; and to then calculate on such average, allowing for the difference in values depending on the ages of the tenants standing admitted. The adopting one fixed average interval," he continues, "would be unjust in many instances towards the lord, and in many towards the tenant; though for practical purposes the result of considerable investigation into the matter shows that in most manors the average interval of fifteen years as to land and thirteen years as to house property, will be a just average to be calculated on as between lord and copyholder." He then capitalises the fines from lands at three per cent. compound interest, and those from houses at four per cent.—a distinction which seems reasonable.

It may be worth pointing out, however, that some injustice is done to the lord by valuing the manor fines upon the assumption of their occuring at regular intervals, instead of at the fluctuating intervals at which they are really received; for it denies to him some of the compound interest which he can make upon his earlier receipts. But I welcome this circumstance as a very desirable set-off for the injustice which is done on the other hand to the tenants by capitalising the fines as of two years' purchase each, whereas it is now very general to take a rather smaller fine in cases of alienation,—although this, by the way, is exactly the reverse of a common practice two centuries ago as recorded by some writers.

On the question of the allowance to be made for an existing tenancy I differ from Mr. Rouse, as before intimated. He says (p. 87) "The difference between the value of an enfranchisement where no life is on the rolls and that where a life of the greatest value stands admitted, and in which the full manorial interval is calculated as that at the end of which the first fine will be payable, will be one fine, or in the case of fines arbitrary, two years' value. It will there follow that, if the best life be equal to a reduction of two years' value as the value of the life diminishes, the portion of the two years' value to be deducted will diminish." This assumption of the best life being equal to a deduction of two years' value, or one fine, is, I submit, inadmissible.

We have seen it to be irrelevant and productive of considerable error in the assumed case of fines payable only after death; and it is impossible to conclude that the incidental introduction of occasional alienation fines can give to the best possible life any theoretical connection with the present question. And observe the effect. At page 128 the perpetuity of the fines of £2 every 15 years is stated to be worth, in the case of a vacant tenancy (speaking roughly), 5½ years' purchase at 3 per cent. interest, and we are there directed to charge 3½ for enfranchisement if the tenant on the rolls is the best possible life, a female child under 6. But that value of the perpetuity is arrived at (Table VIII.) by taking the fine of two years' purchase payable now, and taking 3½ as being the total present value of the fines payable in 15, 30, 45, &c., years. So that in charging this same 3½ years' purchase for the enfranchisement in the most exceptional case of this young child, we shall be calculating as if, notwithstanding her extreme youth, the next fine would yet occur at the end of the *average* interval of 15 years, an assumption which I think indefensible. It does not do justice to the young tenant; she may not alienate at all, but may hold on till death, and, therefore, her most unusually good life indicates a probability of the lord's next fine being distanced beyond the average interval. I submit, as before, that the deduction of one fine is appropriate only to a tenancy which is likely to last for the average period, and this average holding is not to be found in an extreme case—in the scarcely possible tenancy of a child under 6. For want of a record of the relative frequency of the occurrence of surrenders at successive ages, I propose a tenancy at the average admission age—say 35,—as a practical standard, and make for younger or older ages respectively a reduction larger or smaller than a single fine in proportion simply to the values of life annuities at such ages as compared with that of a life annuity at the age 35.

On the next page will be found two tables, called respectively "Annuity Table" and "Enfranchisement Table." The first shows the values in years' purchase at three and four per cent. respectively of annuities upon single lives, both male and female. These are abbreviated from the latest published annuity tables which have been deduced by the present Registrar-General (Dr. Farr), from observations upon the population of England and Wales, known as the English Life Table No. 3. Any person who may use the two tables annexed to this paper will have simply to notice the year's purchase at three per cent. for lands, or four per cent. for houses, appearing opposite to the age of the male or female tenant, as the case may be, in the Annuity Table. And he will then turn to the second or Enfranchisement Table, in which, and opposite to such year's purchase, he will see the value for enfranchisement at three per cent. for lands, and four per cent. for houses; computed for each of a number of different fine-intervals, so that he may be guided by one or other of these according to his opinion, whether as regards the particular property or district with which he is dealing there is a likelihood of alienation fines being more or less frequent. This table gives enfranchisement values corresponding to only each integral number of years' purchase; and it is enough to take such one of these as is the nearest to the year's purchase found in the Annuity Table, because in almost all cases the year's purchase for the enfranchisement is only desired to one decimal place; but if this should be desired to two decimal places, the necessary interpolation of the Enfranchisement Table to correspond with the exact years' purchase taken from the Annuity Table may be effected at sight. And I have given the values in the Enfranchisement Table to only two places of decimals, conceiving from all that has preceded that it is worse than useless to affect any higher degree of accuracy in tables for these enfranchisements.

The values thus offered in the Enfranchisement Table are calculated in accordance with the conclusion already arrived at, that for enfranchisement to a tenant of the age of 35, a sum should be required less by 2 years' value than if the tenement were vacant. A male life of 35 has been selected for this purpose, and there is therefore a slight inconsistency in the table to the extent of its charging a trifle too little in the comparatively rare case of a female life being on the rolls; but the maximum discrepancy (which is at the lowest part of the table) is only about one-twentieth of a year's purchase.

The following selections from the enfranchisement tables hitherto discussed, and in all of which the annual value of the copyhold property is assumed to be £1, will serve for a comparison between them, particularly as regards the effect of Mr. Rouse's selection of the best possible life, and my own selection of the age 35 as the standard for the graduation of our respective tables, to which variation the difference between them is mainly attributable.

For this comparison I have adopted the fine-intervals of 15 years as to land, and 13 years as to house property, upon which Mr. Rouse bases his principal tables, in consonance with his statement before quoted, that considerable investigation has shown these to be fair average intervals. Without supposing that any particular value can attach to isolated observations, I have yet thought it fitting to ascertain the frequency of fines in some of the manors which have come to my notice in consequence of my engagement in the service of your President's firm. And here I should wish to be allowed to acknowledge that, for whatever general conversance I may have with the essential features of the present subject, I am indebted to the teaching of his practice far more largely than to any other source.

I have taken an account of the fines received in a group of manors, all in one neighbourhood, and in all of which a fine arbitrary is paid on admission after death or alienation. The observations extend over only 16 years past, which is a very much shorter period than the 50 or 70 years recommended by Mr. Rouse; but, by taking several manors collectively it is probably long enough, especially as the evidence of recent years (influenced commonly by the extension of railways) may be the most reliable as an indication of the probable frequency of future alienations.

Allowing for the comparatively few enfranchisements which have taken place, I find that the average fine-interval in the manors just referred to is 16 years. The fines after alienations were rather more than half as numerous as the others, and one-fifth of the former fines followed immediately upon fines payable after deaths. The locality is the immediate neighbourhood of Hereford, and the tenements consist of lands rather than houses. In an abstract to which I have had access of the court rolls of another manor, in an agricultural parish in Sussex, and comprising lands subject to arbitrary fines, and cottages subject to fines certain, an observation of 46 years shows an average fine-interval of 18 years. Once more: I have taken together two manors extending into two parishes in the south of England, which contain in all about 4,500 inhabitants, and which comprise a market town and the agricultural lands around it: about half the tenements consists of houses, and the other half lands. Here the fines are all certain, and those received, according to the steward's information, during 20 years, show that the average interval is 21 years; but as it is a very backward place—the population having decreased materially during the period of observation—alienations are likely to have been less frequent than in most localities. It is important to notice how potent an element of the subject is the more or less frequent occurrence of alienation fines, for if there were none such, but if each tenant held on till death, then the average fine-interval would be (approximately) the expectation of life for a person of the average age of tenants at their admission; and supposing that this is 35 years, the expectation is as much as 29 or 30 years. The above averages all indicate an interval longer than the 14 years which is the mean of the two selected by Mr. Rouse; and I am inclined to think that 17 years for lands, or 15 for houses, may be a fair average. Among the profitable materials which could be collected by the council of this institution from the contributions of members, would be observations similar to the above respecting the frequency of the occurrence of fines in manors variously situated; and every such contribution would have a personal use for the member preparing it.

I may add that, in the two manors last mentioned, the widow of a tenant is entitled to hold for her widowhood the whole of the tenement of which her husband died seized; but it seems impossible to account for the circumstance of the fine-interval being as long as 21 years by the assumption that either the frequency of alienations or the (ultimate) inheritance of children is altered by this custom of widowhood. Even if every dying copyholder left a widow, the general effect would be merely to defer the receipt of successive fines of such a series as we have been hitherto considering, and not to reduce the number of the fines receivable during a given period of years. The fine would still be received from the child who inherits, but the receipt of it would be deferred (viz., till the death of both his parents, instead of the death of his father only). Now, against the chance of a widower tenant remarrying and so increasing the probability of widowhood, may be set the chance of a widow remarrying, and so forfeiting her copyhold estate; and remembering that some tenants do not marry, and that widowhoods are sometimes barred by will, and are reduced in number by alienations, I think after careful consideration that in the case of any male tenant holding with this widowhood custom, it will be enough to seek in the annuity table for an age 5 years younger than his (but not less than the age 6).

But we have hitherto dwelt only upon the dry value of the lord's receipts from fines, and have not considered what further allowance he may be entitled to for releasing the copyholder. It may here be noticed that Mr. Rouse suggests (p. 110) an addition of about 10 per cent. whenever "capabilities for improvement" are deemed sufficiently important to warrant an addition in respect of them. There are, however, matters to be considered beyond such improvement of the property as the valuer may anticipate, and which he will remember to take into account as a part of his valuation of the property itself. The peril of forfeiture and escheat, it may indeed be urged, has been reduced in various ways to a minimum, and fines by way of penalties are generally of small account; yet the copyholder is subject to

* Read at the ordinary general meeting of the Institution of Surveyors, January 10th, 1870, by EDWARD SMYTH Associate.

ANNUITY TABLE; Part 1,—3 per cent. (for Lands.)

Age.	Male.	Female.	Age.	Male.	Female.
Yrs.	Yrs'. pur.	Yr's. pur.	Yr	Yrs'. pur.	Yrs'. pur.
0	19.2	19.9	51	14.1	14.8
1	22.4	22.4	52	13.8	14.4
2	23.5	23.5	53	13.4	14.1
3	24.0	24.1	54	13.1	13.7
4	24.3	24.3	55	12.8	13.3
5	24.4	24.5	56	12.4	13.0
6	24.5	24.5	57	12.1	12.6
7	24.4	24.5	58	11.7	12.3
8	24.4	24.4	59	11.4	11.9
9	24.3	24.3	60	11.0	11.5
10	24.1	24.1	61	10.7	11.2
11	23.9	24.0	62	10.3	10.8
12	23.7	23.8	63	10.0	10.4
13	23.5	23.6	64	9.6	10.1
14	23.3	23.4	65	9.3	9.7
15	23.1	23.2	66	8.9	9.4
16	22.9	23.0	67	8.6	9.0
17	22.7	22.8	68	8.3	8.7
18	22.5	22.6	69	7.9	8.3
19	22.3	22.4	70	7.6	8.0
20	22.1	22.2	71	7.3	7.7
21	21.9	22.0	72	7.0	7.4
22	21.7	21.9	73	6.7	7.1
23	21.5	21.7	74	6.4	6.8
24	21.3	21.5	75	6.1	6.5
25	21.1	21.3	76	5.9	6.2
26	20.9	21.1	77	5.6	5.9
27	20.7	20.9	78	5.4	5.7
28	20.5	20.7	79	5.1	5.4
29	20.2	20.5	80	4.9	5.2
30	20.0	20.3	81	4.7	5.0
31	19.8	20.1	82	4.5	4.7
32	19.5	19.9	83	4.3	4.5
33	19.3	19.7	84	4.1	4.3
34	19.1	19.5	85	3.9	4.1
35	18.8	19.3	86	3.8	4.0
36	18.6	19.0	87	3.6	3.8
37	18.3	18.8	88	3.5	3.6
38	18.0	18.5	89	3.3	3.5
39	17.8	18.3	90	3.2	3.3
40	17.5	18.0	91	3.1	3.2
41	17.2	17.8	92	2.9	3.1
42	16.9	17.5	93	2.8	2.9
43	16.6	17.2	94	2.7	2.8
44	16.3	16.9	95	2.6	2.7
45	16.0	16.7	96	2.5	2.6
46	15.7	16.4	97	2.4	2.5
47	15.4	16.1	98	2.3	2.4
48	15.1	15.7	99	2.2	2.3
49	14.8	15.4	100	2.2	2.2
50	14.4	15.1			

ANNUITY TABLE; Part 2,—4 per cent. (for Houses.)

Age.	Male.	Female.	Age.	Male.	Female.
Yrs	Yrs.' pur.	Yrs'. pur.	Yrs.	Yrs'. pur.	Yrs'. pur.
0	16.0	16.6	51	12.9	13.4
1	18.6	18.7	52	12.6	13.1
2	19.6	19.6	53	12.3	12.8
3	20.1	20.1	54	12.0	12.5
4	20.3	20.3	55	11.7	12.2
5	20.5	20.5	56	11.5	11.9
6	20.5	20.5	57	11.2	11.6
7	20.5	20.5	58	10.9	11.3
8	20.5	20.5	59	10.6	11.0
9	20.4	20.4	60	10.3	10.7
10	20.3	20.3	61	10.0	10.4
11	20.2	20.2	62	9.6	10.1
12	20.1	20.1	63	9.3	9.8
13	19.9	20.0	64	9.0	9.5
14	19.8	19.8	65	8.7	9.1
15	19.6	19.7	66	8.4	8.8
16	19.5	19.5	67	8.1	8.5
17	19.3	19.4	68	7.8	8.2
18	19.2	19.2	69	7.5	7.9
19	19.0	19.1	70	7.2	7.6
20	18.0	19.0	71	7.0	7.3
21	18.8	18.9	72	6.7	7.0
22	18.6	18.7	73	6.4	6.8
23	18.5	18.6	74	6.2	6.5
24	18.4	18.5	75	5.9	6.2
25	18.2	18.4	76	5.7	6.0
26	18.1	18.2	77	5.4	5.7
27	17.9	18.1	78	5.2	5.5
28	17.8	18.0	79	5.0	5.2
29	17.6	17.8	80	4.8	5.0
30	17.5	17.7	81	4.6	4.8
31	17.3	17.5	82	4.4	4.6
32	17.1	17.4	83	4.2	4.4
33	16.9	17.2	84	4.0	4.2
34	16.8	17.1	85	3.8	4.0
35	16.6	16.9	86	3.7	3.9
36	16.4	16.7	87	3.5	3.7
37	16.2	16.6	88	3.4	3.5
38	16.0	16.4	89	3.3	3.4
39	15.8	16.2	90	3.1	3.3
40	15.6	16.0	91	3.0	3.1
41	15.3	15.8	92	2.9	3.0
42	15.1	15.6	93	2.8	3.9
43	14.9	15.4	94	2.7	2.8
44	14.6	15.2	95	2.6	2.7
45	14.4	14.9	96	2.5	2.6
46	14.2	14.7	97	2.4	2.5
47	13.9	14.5	98	2.3	2.4
48	13.7	14.2	99	2.2	2.3
49	13.4	14.0	100	2.1	2.2
50	13.1	13.7			

The first payment of the Annuity is supposed to be made at the specified age instead of (as usual) one year later.

ENFRANCHISEMENT TABLE; Part 1,—3 per cent. (for Lands.)

Years' purchase value of an Annuity on the Life.	Number of years intervening between fines, according to whether the occurrence of alienations is Frequent, 13 | 14 | 15 | Ordinary, 16 | 17 | 18 | or Rare. 19 | 20 | 21
0, or vacant tenancy.	6.27 | 5.90 | 5.58 | 5.31 | 5.06 | 4.85 | 4.65 | 4.48 | 4.32
1	6.16 | 5.80 | 5.48 | 5.20 | 4.96 | 4.74 | 4.55 | 4.37 | 4.22
2	6.06 | 5.69 | 5.37 | 5.09 | 4.85 | 4.62 | 4.44 | 4.27 | 4.11
3	5.95 | 5.58 | 5.27 | 4.99 | 4.74 | 4.53 | 4.34 | 4.16 | 4.01
4	5.84 | 5.48 | 5.16 | 4.88 | 4.64 | 4.42 | 4.23 | 4.06 | 3.90
5	5.74 | 5.37 | 5.05 | 4.78 | 4.53 | 4.32 | 4.12 | 3.95 | 3.80
6	5.63 | 5.26 | 4.95 | 4.67 | 4.43 | 4.21 | 4.02 | 3.84 | 3.69
7	5.52 | 5.16 | 4.84 | 4.56 | 4.32 | 4.10 | 3.91 | 3.74 | 3.58
8	5.42 | 5.05 | 4.73 | 4.46 | 4.21 | 4.00 | 3.80 | 3.63 | 3.47
9	5.31 | 4.95 | 4.63 | 4.35 | 4.11 | 3.89 | 3.70 | 3.52 | 3.37
10	5.21 | 4.84 | 4.52 | 4.24 | 4.00 | 3.78 | 3.59 | 3.42 | 3.26
11	5.10 | 4.73 | 4.42 | 4.14 | 3.89 | 3.68 | 3.48 | 3.31 | 3.16
12	4.99 | 4.63 | 4.31 | 4.03 | 3.79 | 3.57 | 3.38 | 3.21 | 3.05
13	4.89 | 4.52 | 4.20 | 3.93 | 3.68 | 3.47 | 3.27 | 3.10 | 2.94
14	4.78 | 4.41 | 4.10 | 3.82 | 3.58 | 3.36 | 3.17 | 2.99 | 2.84
15	4.67 | 4.31 | 3.99 | 3.71 | 3.47 | 3.25 | 3.06 | 2.89 | 2.73
16	4.57 | 4.20 | 3.88 | 3.61 | 3.36 | 3.15 | 2.95 | 2.78 | 2.62
17	4.46 | 4.09 | 3.78 | 3.50 | 3.26 | 3.04 | 2.85 | 2.67 | 2.52
18	4.36 | 3.99 | 3.67 | 3.39 | 3.15 | 2.93 | 2.74 | 2.57 | 2.41
19	4.25 | 3.88 | 3.56 | 3.29 | 3.04 | 2.83 | 2.63 | 2.46 | 2.31
20	4.14 | 3.78 | 3.46 | 3.18 | 2.94 | 2.72 | 2.53 | 2.35 | 2.20
21	4.04 | 3.67 | 3.35 | 3.08 | 2.83 | 2.61 | 2.42 | 2.25 | 2.09
22	3.93 | 3.56 | 3.25 | 2.97 | 2.72 | 2.51 | 2.32 | 2.14 | 1.99
23	3.82 | 3.46 | 3.14 | 2.86 | 2.62 | 2.40 | 2.21 | 2.04 | 1.88
24	3.72 | 3.35 | 3.03 | 2.76 | 2.51 | 2.30 | 2.10 | 1.93 | 1.77
25	3.61 | 3.24 | 2.93 | 2.65 | 2.41 | 2.19 | 2.00 | 1.82 | 1.67

ENFRANCHISEMENT TABLE; Part 2,—4 per cent. (for Houses.)

Years' purchase value of an Annuity on the Life.	Number of years intervening between fines, according to whether the occurrences of alienations is Frequent, 11 | 12 | 13 | Ordinary, 14 | 15 | 16 | or Rare. 17 | 18 | 19
0, or vacant tenancy.	5.71 | 5.33 | 5.01 | 4.73 | 4.50 | 4.29 | 4.11 | 3.95 | 3.81
1	5.59 | 5.21 | 4.89 | 4.61 | 4.38 | 4.17 | 3.99 | 3.83 | 3.69
2	5.47 | 5.09 | 4.77 | 4.49 | 4.26 | 4.05 | 3.87 | 3.71 | 3.57
3	5.35 | 4.97 | 4.65 | 4.37 | 4.13 | 3.93 | 3.75 | 3.59 | 3.44
4	5.22 | 4.84 | 4.52 | 4.25 | 4.01 | 3.81 | 3.63 | 3.47 | 3.32
5	5.10 | 4.72 | 4.40 | 4.13 | 3.89 | 3.69 | 3.51 | 3.35 | 3.20
6	4.98 | 4.60 | 4.28 | 4.01 | 3.77 | 3.57 | 3.39 | 3.23 | 3.08
7	4.86 | 4.48 | 4.16 | 3.89 | 3.65 | 3.45 | 3.27 | 3.10 | 2.96
8	4.74 | 4.36 | 4.04 | 3.77 | 3.53 | 3.33 | 3.14 | 2.98 | 2.84
9	4.62 | 4.24 | 3.92 | 3.65 | 3.41 | 3.20 | 3.02 | 2.86 | 2.72
10	4.50 | 4.12 | 3.80 | 3.53 | 3.29 | 3.08 | 2.90 | 2.74 | 2.60
11	4.38 | 4.00 | 3.68 | 3.41 | 3.17 | 2.96 | 2.78 | 2.62 | 2.48
12	4.26 | 3.88 | 3.56 | 3.29 | 3.05 | 2.84 | 2.66 | 2.50 | 2.36
13	4.14 | 3.76 | 3.44 | 3.16 | 2.93 | 2.72 | 2.54 | 2.38 | 2.24
14	4.02 | 3.64 | 3.32 | 3.04 | 2.81 | 2.60 | 2.42 | 2.26 | 2.12
15	3.90 | 3.52 | 3.20 | 2.92 | 2.69 | 2.48 | 2.30 | 2.14 | 2.00
16	3.78 | 3.40 | 3.08 | 2.80 | 2.57 | 2.36 | 2.18 | 2.02 | 1.88
17	3.66 | 3.28 | 2.96 | 2.68 | 2.45 | 2.24 | 2.06 | 1.90 | 1.76
18	3.53 | 3.16 | 2.83 | 2.56 | 2.32 | 2.12 | 1.94 | 1.78 | 1.63
19	3.41 | 3.03 | 2.71 | 2.44 | 2.20 | 2.00 | 1.82 | 1.66 | 1.51
20	3.29 | 2.91 | 2.59 | 2.32 | 2.08 | 1.88 | 1.70 | 1.54 | 1.39
21	3.17 | 2.79 | 2.47 | 2.20 | 1.96 | 1.76 | 1.58 | 1.42 | 1.27

EXAMPLE.

Lands; suppose fine interval is estimated at 15 years, and tenant, a male, aged 10, Annuity = 14·1 year's purchase. Enfranchisement = 3·02 years' purchase (see paper).

NOTE.

If there is a Widowhood custom in the Manor (see paper.)
In the case of Building Land (see paper.)
In cases other than Building Land, add for the change of tenure one year's purchase of Land, or half a year's purchase of House Property (see paper.)
As to Timber and Minerals, (see paper.)
For Quit-rents and Heriots (see paper.)

Age of the Tenant on the Court Rolls.	COPYHOLD COMMISSIONERS.	MR. ROUSE'S TABLE. MALE TENANTS.		PRESENT TABLE. MALE TENANTS	
		LANDS. 3 per cent. 15 years' fine-interval.	HOUSES. 4 per cent. 13 years' fine-interval.	LANDS. 3 per cent. 15 years' fine-interval.	HOUSES. 4 per cent. 13 years' fine-interval.
	£	£	£	£	£
10		3.739,978	3.1293	3.02	2.55
20	3.000,000	3.909,854	3.2780	3.24	2.73
35	3.281,621	4.098,824	3.4326	3.58	3.01
50	3.905,266	4.450,097	3.7615	4.05	3.42
70	5.000,000	4.995,155	4.3301	4.78	4.18
90		5.472,889	4.8740	5.25	4.63
Vacant Tenancy		5.585,000	5.0075	5.58	5.0

Age.	10	20	35	50	70	90	Vacant Tenancy
Lands.	3.50	3.72	4.06	4.53	5.25	5.73	6.66
Houses.	2.54	2.72	3.00	3.41	4.12	4.62	5.00

the possibility of any penal custom being pressed by the lord, and three pages of Mr. Scratchley's book contain an epitome of quite a modern case, in which less than 4 acres of land gave rise to a fearfully long series of actions and suits, including proceedings at law against the Lord Chancellor himself, who had given judgment in favour of a company in which his lordship held shares. There is also the dormant value that must exist in the case of any property in which two persons have interests that are not harmonious. Here the surveyor may almost tell the mathematician that the parts do not make up the whole. It is no doubt the consideration of these circumstances that leads to the copyholder at fine certain being always charged more for enfranchisement than the dry value of the lord's receipts. Such receipts arising from fines would, in strictness, be calculated by applying the 3 per cent. enfranchisement table to half the amount of the fine. But, besides this, the copyholder, according to the commissioners' later reports, is ordinarily charged about half a year's value of the property; and I propose that a like specific addition (irrespective of the age of the tenant) should, from the same consideration, be made in the enfranchisement of copyholds held at fine arbitrary, but that here the addition should, in the case of land, be an entire year's purchase, because the periodical valuations for the arbitrary fines keep the tenements with their timber and minerals under the watch of the lord, and because his fines are increased by any outlay in the draining or other amelioration of the land and the improvement of the buildings upon it. For house property an addition of half a year's value is probably sufficient. The effect of these respective additions to the extracts from the tables annexed to this paper will be readily seen; but if instead of the fine-intervals there adopted, viz., 15 years for land and 13 for houses, we refer respectively to the intervals of 17 and 15 years which I have conjectured to be the average periods, the enfranchisement values for these intervals, as afforded by the annexed tables in the case of male lives, will, when augmented in the manner just mentioned, become as in the following table. The question of what may be the average fine-interval is, however, very insignificant as compared with the question of what is the interval appropriate to any given case.

As regards Building Land, however, the addition that is requisite is of a special kind; and each case seems to require separate consideration upon its own merits. Probably on an enfranchisement of uncovered building land no one would award less to the lord than somewhere about the same proportion of its fee simple value that he would award in the case of other property; for, notwithstanding the arbitrary fine, copyholders have been continually found to build, and in the event of any such building, the lord's future fines are calculated upon an improved annual value, which includes not simply what would be the ground rent, but also the further annual value of the buildings themselves. But in the case of a large tract of building land, fitted for the erection of a number of houses, it seems to me that in strictness the lord is commonly entitled to a materially larger proportion notwithstanding that tenants may generally obtain enfranchisements upon easier terms. Regard may be had to the greatest number of years certain for which the custom of the particular manor will enable a copyholder to demise his lands without license and with license respectively, and also to

the amount of the fine he must pay for any such license; and of any building value that may be thus available to the copyholder he should be charged for enfranchisement only such a proportion as is indicated by (probably) the 4 per cent. Enfranchisement Table. But the difference between such value, and the fee simple value of the property, if entirely unfettered (as would be the case after the enfranchisement), is a surplus value that is dormant during the existence of the copyhold tenure, and, in the words of the 16th section of the Copyhold Act of 1852, is "an advantage to arise from the enfranchisement;" the lord should, therefore, receive a further payment of one-half of this difference, for it must belong equally to the two parties whose concurrence is necessary to make the surplus available. And this equal division of such surplus building value applies to copyholds at fine certain just as much as to those at fine arbitrary. This, I submit, is the strict justice of the case, although many lords may be willing as an act of grace to accept a smaller compensation for the obstructive power they possess.

Again, with respect to *Timber* and *Minerals*, which neither lord nor tenant can touch without the consent of the other, the same equal partition of their value is required, unless by the well-established custom of any particular manor the value is shared in any other proportion.

To be theoretically accurate, *quit-rents* should, I think, be uniformly valued for enfranchisement at 30 years' purchase, after deducting such an annual sum as the collection of the particular quit-rent may be estimated to cost.

Heriots, when taken not only upon the death of a tenant, but also upon a surrender followed by the admission of a purchaser of the copyhold, could be valued for enfranchisement by multiplying the years' purchase in the enfranchisement table by half the value of the heriot, if it is a fixed sum of money. But when the lord has the power of taking the beast or goods of the tenant, the value for enfranchisement must depend in a great measure upon the probable nature of the next heriot, and this will be estimated according to the social position of the present tenant. From an observation in Mr. Rouse's manual (p. 107) it appears that the Copyhold Commissioners have stated that for the enfranchisement of heriots "payable on alienation as well as death," twice as much should be paid as when the heriots are receivable upon death only. Hence it would seem to be their opinion that deaths occur with only the same frequency as alienations. If this opinion is not sufficiently correct, it errs in over-estimating the general frequency of alienations, and, therefore, relatively under-estimating the sum that should be paid for the enfranchisement of heriots receivable only on the death of the tenant.

The object of such societies as the present may, I suppose, be summed up as that of progressing in one way and another from surmise towards certainty; and the present paper has been prepared in the hope that it may be a step, however feeble in that direction, as well as a discharge of the obligation which is laid by this institution not only upon its members but upon its associates also.

INSTITUTION OF SURVEYORS.

At the ordinary general meeting held on Monday, January 10th, the following names were read and passed to be balloted for on February 7th, viz:—As Members—William Blount, Orchehill House, Gerrard's-cross, Bucks; Francis Field, Oxford; John Lees, Reigate; James Martin, Wainfleet, Boston, Leicestershire; James Rawlence, Salisbury. As Associates—Ernest Carritt, 16, Basinghall-street, E.C.; George Henry Tatham, 14, Cockspur-street, Pall Mall; John Wigram, Bromleys, Harlow, Essex.

The following donations to the library were announced,—"House of Commons Report on Agricultural Customs." By J. B. Denton. R. Horton.—"Tables for Planting and Valuing Underwood and Woodlands."—Messrs. Daniel Smith, Son, and Oakley. G. A. Dean.—"A Treatise on the Land Tenure of Ireland." By the Author. Brayley and Britton.—"History of Surrey," in 5 vols. By John Wornham Penfold, Sen. The following donations to the library fund were announced.—J. L. Hornblower, £3 3s.; W. Snooke, £5 5s.; W. Turner, £3 3s.; F. Willmott, £5. A vote of thanks was unanimously given to the various donors.

A paper was read by Mr. E. Smyth, entitled "The Enfranchisement of Copyholds of Inheritance." A vote of thanks was accorded to Mr. Smyth. A short discussion ensued, which was adjourned to February 7th.

The following candidates were balloted for, and declared duly elected, viz: As Members—Frederic Chancellor, Chelmsford, Essex; George Bridge Hilliard, Chelmsford, Essex. As Associates—Ralph William Clutton, Hartswood, Reigate; William Jeeves Crawley, 10, Waterloo-place; Thomas Twining Wing, Bedford.

The next meeting will be held on Monday evening, January 24th, when the adjourned discussion on Mr. Hope's paper, entitled "The Distribution and Agricultural Use of Town Sewage," will be resumed. The following candidates will be balloted for, viz: As Members—John Edward Poundley, Black Hill, Kerry, Montgomeryshire; George Rawlence, Salisbury. As Associate—Andrew Johnstone, 25, Gresham-street, E.C.

KIMCOTE CHURCH, LEICESTERSHIRE.

WE this week give a photo-lithograph of the parish church at Kimcote, near Lutterworth, which has just lately been restored. In plan it consists of nave, chancel, north aisle, with chantry, chapel, western tower, and south porch. The south side shows clearly that the original church was much lower in elevation, and had high pitched roofs, but in the 16th century the clerestory was added with flat roofs covered with lead. In the works just carried out the nave roof has been thoroughly repaired, and entirely new roofs placed upon the aisle and chancel, the tracery of the windows and the other stonework restored; the south porch entirely re-built; new seats provided throughout the church; the flooring of the chancel laid with Minton's encaustic and plain tiles in paterns. A handsome oak pulpit, a lectern, and three painted windows are special gifts. The glass for two of the above windows is the work of Messrs. Clayton and Bell, and for the other, Messrs. Cox and Co. were employed. The whole of the builder's works were executed by Messrs. Law and Son, of Lutterworth, under the superintendence of the architect, Mr. William Smith, of 10, John-street, Adelphi.

Building Intelligence.

CHURCHES AND CHAPELS.

TAUNTON.—The chancel of S. Mary's Church, Taunton, was re-opened last week after the erection of a new reredos. A plan for raising the floor two feet and placing a new reredos and sculptured entablature behind and above the altar was acquiesced in by the parishioners, and the work has been accomplished by Mr. Davis, builder. The roof of the chancel has been redecorated from the designs and under the superintendence of Mr. A. Stansell, of Taunton. The canopied reredos, with its niches and crockets of yellow Mansfield stone, the altar-piece, of pure white Caen, representing our Saviour's Agony in the Garden, is sculptured in *alto relievo*, from a design of Mr. G. E. Street, A.R.A., by Mr. T. Carp, Lambeth, together with the standing figures of the Blessed Virgin, S. Mary Magdalene, and the four evangelists.

BARNSTAPLE, DEVON.—The new church of Holy Trinity was opened by Dr. Temple, Bishop of Exeter, on the 12th inst. The church was originally built in 1846, but owing to its defective construction, fell so quickly to decay that the whole of it, save only the tower, has been entirely re-built. The tower is a fine Perpendicular one, standing one hundred and thirty feet high. It was somewhat higher, but has been lowered some feet, and advantage has been taken of the scaffolding erected for that purpose to carve the blocks left for ornamental purposes at the time of its construction. The new church, which is cruciform, follows nearly the plan of the old walls; with an extension westward of a few feet, and eastward by the addition of an apse. The nave, instead of being as before, in one single span, with walls comparatively low, is now divided into three parts. The central part has lofty walls forming a clerestory, into which the old nave windows are incorporated, with new hooded curtain ribs on the inside. There are now narrow side aisles with small two-light windows, separated from the nave by an arcade on either side of Hatherleigh and Ham-hill stone, with moulded capitals. The chancel aisles are covered with double roof transversely, and there is a narrow aisle to these, connecting them with the nave aisles by transverse arches. The old roof timbers are re-constructed and the carved angels are used again for the corbels, but the apsidal roof of the chancel is carved on small vaulting shafts with carved capitals. The old pews are re-constructed into open benches, and the chancel is fitted with stalls. There is the old pulpit, a new litany desk and lectern, and the old altar is considerably enlarged both in height and length. The chancel is laid with Minton's tiles. A memorial window in stained glass in the south aisle is from a design of the architects; another is in course of execution for the east window by Messrs. Powell. In the west window some coloured glass pateræ is introduced. The stonework of this window is made of the old work, but reduced from seven lights to five. The contractors were Messrs. Hartnoll, Pulsford and Cox, of Barnstaple. The carving of the tower was executed by Mr. Harry Hems, of Exeter. The architect is Mr. W. White, F.S.A., of Wimpole-street, London.

LIVERPOOL.—The new Greek church of S. Nicholas, at Liverpool, recently erected under the superintendence of Mr. Henry Sumner, F.R.I.B.A., was consecrated on Sunday last by the Archbishop of Syra and Tenos. The style is Byzantine. It is built of red brick and light stone, and is placed upon a massive stone rock faced and with slightly battered basement. The walls are in alternate bands of brick and stone to a certain height; the windows are semicircular, headed with brick and stone arches; the central dome of the church, covered with lead, surmounted by a gilt cross, rises from the intersection of the nave and transept roofs, and forms a Greek cross; the apsidal east end and its three western domes over the narthex, and its lateral projections, form the characteristic features of the best examples of ancient Greek churches. The plan and general arrangements of the building are based upon those of the Church of S. Theotocos at Constantinople, erected in the 5th century. The church consists in plan of an oblong 69 feet by 54 feet within the walls, combining nave, central transepts, and aisles. The eastern bays, or that portion which corresponds with our chancel and aisles, will be screened off by means of the Iconostasis, and terminated by a central projecting apse, with small side ones formed in the thickness of the wall. To the west of the nave, and its whole width, 54 feet by 18 feet 6 inches, is the narthex or vestibule, entered by the central west doorway. Eight magnificent columns which support the roof are specially worthy of notice. They were supplied by Mr. Fabbricotti, from his well-known Carrara quarries. The height of the nave vault is 45 feet, and to the eye of the central dome, 72 feet. The iron work of the interior, together with the apparatus for heating and the iron gates and palisading outside, were supplied by Mr, J. Gibbs, of Doran's-lane, Liverpool. The contractor for the whole of the work, which has been satisfactorily concluded, including the fittings, was Mr. William Tomkinson, of Brownlow-street, Liverpool. The entire cost has been about £14,000. Readers of THE BUILDING NEWS as far back as 1864, will, probably, remember that Messrs. W. and J. Hay were originally appointed architects of the building, but in consequence of these gentlemen resenting what they deemed improper interference with their professional conduct, the committee resolved to have the plans carried out by Mr. Henry Sumner.

INCORPORATED SOCIETY FOR PROMOTING THE ENLARGEMENT, BUILDING, AND REPAIRING OF CHURCHES AND CHAPELS.—The usual monthly meeting of this society was held on Monday, at the Society's house, 7, Whitehall, S.W.; the Hon, and Rev. A. Legge in the chair. Grants of money were made in aid of the following objects:—Building new churches, viz., S Matthew's Commercial-road, a district formed from the parishes of Limehouse and Stepney; S. Paul's, Middlesborough, Yorkshire; and S. Stephen's, Walworth-common, Surrey; rebuilding the church at Bettws Ifan, near Newcastle Emlyn, Cardigan; enlarging or otherwise increasing the accommodation in the churches at Ruislip, near Uxbridge; Watford, Herts; Wormingford, near Colchester; and Connington, near S. Ives. Under very urgent and peculiar circumstances the grants formerly made were increased towards enlarging and restoring the churches at Broadwood Kelly, near Winkleigh, Devon; and Llanfwrog, near Ruthin, Denbigh.

CYMMAU.—A galvanised corrugated iron build-

ing, to be used on Sundays as a church, and on week days as a school, has just been completed on the side of Hope Mountain, Flintshire. It is capable of seating about 200 persons, and is lighted by six elliptical headed windows on the sides, and larger ones at each end. The entrance is on the south side, through a porch. The structure is lined with wood. Mr. S. Sothern, Henblass-street, Wrexham, was the designer and contractor.

CROYDON.—A new Congregational church is about to be erected at South End, Croydon, from plans prepared by Mr. Barker, architect, Wellesley-road. Accommodation will be provided for 400 persons, and a school-room will be attached capable of accommodating 300 children. The cost is estimated at about £2900.

BUILDINGS.

PRESTON.—The Preston and county of Lancaster Infirmary is now open for the reception of patients. The western pavilion forms one-half of the complete plan. The erection of the eastern one is left to the future. The building, formerly known as the House of Recovery, has been enlarged and re-arranged to form the administrative department, as well as the dispensary and out-patients' department of the institution. That building and the former limits of the site, north and south, determined the disposition of the new pavilion. First, a corridor, 12 feet wide and 45 feet long, with windows on both sides, extend westward from the corridor of the old structure, and affords due separation from and access to the pavilion. At the end of the corridor is the pavilion, extending from the former at right angles to what were the limits of the site, north and south, when operations were commenced. It is a lofty building, of two stories in height above ground, and the arrangements on each floor are identical. The large south wards are one above the other. These are fine rooms, each 110 feet long, 26 feet wide, and a little over 16 feet in height, arranged for 24 beds, two beds between each window. Taking the maximum number at 28 beds, there being room, when no fires are lighted, for four more, there are upwards of 100 square feet of floor area to each patient, and 1700 cubic feet of air space. The arrangements for ventilation are very ample. A spacious staircase, westward of the corridor, connects the various floors by an easy ascent from the basement to the top. Northwards of the staircase are wards for special cases, two on each floor, and beyond those a ward of eight beds on each floor, 37ft. 0in. by 26ft. 0in. by 16ft. 6in. high, all with provisions for warming and ventilating. The wards for special cases contain 2300 cubic feet of air space to each patient, and 150 square feet of floor space. The north wards of eight beds each contain 1900 cubic feet of air space to each patient, and 120 square feet of floor space. Altogether the maximum accommodation in the pavilion is for seventy-six beds. The administrative department, offices, &c., are well constructed and completely furnished with all necessary requirements. The amount of the present building contract has been £11,700. Mr. Hibbert was the architect.

THE NEW ARCADE, CARDIFF.—The new Arcade, S. Mary Street, Cardiff, opposite the Royal Hotel, was opened on Monday. The Arcade contains 60 shops, some with dwelling-houses attached. The length is 420ft. and the breadth 13ft. The cost of the undertaking is £10,000, which is paid by a company. It will, however, be lighted up at the town expense, in consequence of its great convenience. The architect is Mr. P. Price, and the builder Mr. S. Shepton. The large skylight at the top affords quite sufficient light during the day, while the whole of the interior is painted in such a manner as to assist the light.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

P. O. O's to be made payable to J. Passmore Edwards, at the Strand Office. All cheques to be crossed on the Union Bank.

RECEIVED.—M. T. S., —R. and S.—J. P. S.—R. S. T.—J. A. G.—A Subscriber—J. W. and Co.—E. H. R.—W. H. P.—J. G.—W. J.—Toronto—D. H. and J. N.—J. P. S.—P. E. M.—W. and Co.—C. and Co.—M. and Co.—F. G.—G. N.—W. J. S.—J. W. T.—J. W. R.—M. L.—H. J. J.—J. M.—C. P. and L.—C. P. and G.—J. E.,—J. B.—J. R. S.

E. M.—Send the question, with a drawing of the old coin, to the *English Mechanic*, and you are almost sure to get an answer.

J. R. WALKER.—With sketch from Holyrood Chapel.

SMOKE PREVENTION.—Have nothing to do with "J. Edwards and Co.," of Vansitart-street, Deptford. He has just retired to Edinburgh, from whence, we believe, he came, forgetting to settle with his creditors. We believe, moreover, it is not the first occurrence of the kind.

Correspondence.

LIAS LIME.

(To the Editor of THE BUILDING NEWS.)

SIR,—I have read with much interest the excellent article on lias lime, contributed by Mr. Gilbert R. Redgrave to THE BUILDING NEWS of the 17th December last. While, however, agreeing with the writer's conclusions as to the various processes of calcination at present in use in this country, I cannot but think that in approaching the economical aspect of the question he assumes too much. I fear he will find few practical men agreeing with him in the possibility of manufacturing an artificial lias "so as to leave a fair margin of profit." I am myself ignorant of the selling price of the Barrow lime to which Mr. Redgrave appears exclusively to have confined his attention; but when he is informed that at Lyme Regis, which exhibits, both in a geological and commercial sense, one of the richest deposits of blue lias in the world, the stone can be shipped in exhaustless abundance at less than four shillings per ton, he will, I think, be disposed to modify somewhat his expressions of surprise that there should hitherto have been no attempt on the part of manufacturers to give practical expression to his views. I have referred particularly to Lyme Regis, as being more immediately within my own personal knowledge, but I believe the same remarks will equally apply to the limestone obtainable at Aberthaw, Rugby, and other localities within the ambit of the liassic formation.—I am, Sir, yours, &c.

A CONTRACTOR.

London, January 17th, 1870.

INTERNATIONAL ART EXHIBITION.

SIR,—Can you tell me the name of the architect, if one there is, employed in the erection of the International Art Exhibition building now in course of erection at South Kensington? It is to be hoped that by the employment of a competent person we shall not be terrified again with anything so hideous as the Exhibition building of 1862. The matter is important, as the structure now in progress is intended to be permanent. The neighbouring museum buildings also furnish a warning of want of proper consideration and definite plan, which should be noticed and borne in mind. A portion of the south front is completed in elaborate brickwork and terra cotta, and excepting the ridiculous size of the entrance doorway, and one or two other blemishes, would, if the design was perfectly carried out, present an interesting and even attractive façade. On the east side, however, two parallel projections are built, one of them only just erected, in defiance of all symmetry, utterly ignoring the ornamental wing on west side. Consequently the finished and costly portion must always remain a fragment, unless at a great sacrifice the buildings are some of them pulled down.

It is stated that the International Exhibition is to be opened next year, but I have seen no public announcement. As no work is to be admitted that has been previously exhibited, the Commissioners are giving artists and others but slender chance of producing fine works.—I am, Sir, &c.,

P. E. M.

"FLATS" FOR THE MIDDLE CLASSES.

SIR,—It is a strange fact that the two extremes of society, the Upper Ten Thousand and quite the lower classes, are only those benefited by the introduction of the continental system of letting off suites of apartments on the various floors to different families. Judging from the great demand for residential chambers, I feel assured that were capacious mansions erected, replete with every convenience, and having on each floor, dining, sleeping, and culinary apartments, they would quickly find tenants. What is wanted are good substantial dwellings for middle class folk. The flats in the neighbourhood of Victoria-street are, of course, far too expensive.

The many large plots of land abutting on and in close proximity to the Holborn Viaduct, would be admirably adapted to such a purpose. It would be useless to build rows of shops with no adjacent neighbourhood to supply customers, but if the ground floors were devoted to shops, and the upper ones, to convenient apartments at moderate rents, besides being a great improvement to the City, I firmly believe the scheme would answer, in a financial point of view.—I am, Sir, your obedient servant.

J. B. G.

"FASTI HEREFORDENSES."

SIR,—Allow me to thank you for the honour you have done me in devoting a leading article in your impression of December 24 to a description of my "Fasti Herefordenses." I was quite prepared to submit to the usual fate of most authors, viz., severe criticism and rough handling on all weak points. Your adverse remarks were fair enough, but I should be glad of offering a few remarks to the writer of that article for his information.

I. Title page.—This is certainly very miscellaneous, and we were never quite satisfied with it—this was our first attempt, and expense alone deterred us from reproducing it in better form. My object was to take an opportunity of showing the nature of what appeared to me beautiful letters in our Cathedral Library. I have no doubt that a more successful result would have been attained if there had been more freedom about the corners, and no modern letters used whatever; but my colleague thought ancient letters only would be unintelligible to most persons. The trouble and expense I incurred over this title forced me to the cheaper and better foreign market for my other plates.

II. My name is not quite so modern as the writer supposes. The family of my name, having undergone various spellings have been located in Buckinghamshire, Henley on Thames, and Great Milton at least for 300 years past, as registers prove.

III. The stamping of the covers.—On page 219 it is stated that these are fac similies of a printed volume in the Cathedral Library, date 1516.

IV. I am extremely sorry that the writer had not seen one of the best, or Two Guinea copies of the work, which contain certain coloured illustrations not given in the guinea copies. I feel sure that these would have pleased him as I took special pains to do justice to plates 4 and 5.

I should have observed above that the best copies are bound in leather; in these the stamp comes out with much better effect.

The papers which caused the greatest labour were the "Map," the "Library," and the "List of Books," &c.

I shall, during the present year, devote myself to taking the Map through the press, and I must also make every exertion to beat up as good a list of subscribers as possible; if you will assist in spreading information about this rare object I shall feel truly obliged. Allow me to subscribe myself, yours, &c.,

FRANCIS T. HAVERGAL,
Minor Canon of Hereford Cathedral.

Lyde Vicarage, near Hereford, Jan. 14, 1870.

THE BUILDING NEWS SKETCH BOOK.

SIR,—I have read with no little alarm the suggestions of your late correspondents on the above subject. May I offer a few remarks which I am sure would be endorsed by all who are acquainted with the circumstances that brought your very interesting and valuable Sketch Book into existance.

First of all I would ask why and for what purpose it was instituted? The right reply, if I am not much mistaken, would be, To enable us to make a friendly interchange of sketches of ancient works of architecture, "not modern designs." Such works being distributed far and near throughout the country, thousands not having the time or means at their disposal to visit them, would necessarily be debarred from the advantages they offer for furthering their studies. I am sure that all who are animated with a proper love for their profession, would do their best endeavours to contribute at least one sketch to add to the many, and by so doing we should obtain lasting memorials of the grand and beautiful works of our forefathers, which ought to be the pride of our nation, but which I regret to say are now either ruthlessly destroyed or indifferently allowed to sink into decay, and ere long will become things of the past, little or nothing being left to tell the tale of their former magnificence. Let me thank you, Mr. Editor, for your praiseworthy efforts to add to that little by opening a way through the medium of your Sketch Book.

In reference to the modern designs, &c., proposed to be introduced, I would but add that the pages of THE BUILDING NEWS have always a plentiful supply, and I think it would be but fair to finish with that which is really genuine and instructive, ere we accept that which, I am sorry to say, only too often proves itself to be of but doubtful character.—I am, yours, &c.,

W. CLEMENT WILLIAMS.

SIR.—Being a subscriber to your valuable paper, I have watched with great interest its progress and success. I am very pleased with your new scheme, the "Sketch Book." I was rather surprised at your correspondent ("Contributor's") suggestion, with regard to the introduction of original designs. This I think would depreciate its value very much, and destroy its present historical character. I have an idea, which, I think, might be adopted to a certain extent. It is, that copies of photographs, in keeping with the "Sketch Book," should be accepted, if found of sufficient interest, for the following reasons. A larger number of sketches would be forwarded, and, as the photograph would be a fac-simile of the building, there would be little ground for fear as to the correctness of the sketch. Your subscribers may have photographs of old and interesting buildings, when it is impossible for them to take sketches. In copying from a photograph, more time can be expended on the

drawing, whereby a clearer and better idea of the details would be obtained than from a rough sketch.

I propose, in case a prize should be given, that the preference be awarded to those who have made their sketches from the original subject.—I am Sir, yours, &c. J. G. B.

LUNCHEONS AND ABBEY RUINS.

SIR, — There is an underlying element of discord among certain of your readers, doubtless engendered by the deplorable religious strife of the day, which never fails to crop up when opportunity offers, and if refused admission in its positive form into a journal which, as yours, professes to steer clear of all disputes of the kind, is only too glad of a plausible pretext for venting its fanaticism in an attack upon any expression of opinion concerning a subject upon which it may consider itself competent to hold forth.

I beg to indict this morbid disease as an intolerable nuisance to all *bona fide* readers of a professional paper, and, as a case in point, would call attention to a letter in your last week's issue, in which Mr. Walcott is accused of bigotry on account of an expression of indignation at acts which are only perpetrated by the vulgar and ignorant, and whose too frequent occurrence makes every true churchman's heart burn with shame within him.

I repudiate all attempt here to raise the religious point, the validity of Christian consecration, or to pursue the question of the suitableness of the tourist's choice of a luncheon place, or even to descant upon the propriety of the croquet lately in full swing within the hallowed walls of Glastonbury, but I wish to protest once for all against the admission into this paper of the turbulent spirit which strives to mar with its irrelevant objections the interest of such articles as the one referred to. C. S. W.

London, Jan. 17, 1870.

COMPETITIONS.

CHELTENHAM UNION SCHOOLS COMPETITION.—The result of this competition, confined by invitation to the local architects, has been the selection of the plans marked "Hope" prepared by Mr. J. Thomas Darby.

EASTRY, KENT. — In November last, the guardians of the Eastry Union invited four or five architects to prepare designs for a new infirmary, capable of accommodating 100 patients. The designs of Mr. T. C. Knightley, of 106, Cannon-street, City, were selected by the guardians on the 12th inst. The drawings have been sent to the Poor Law Board for their approval.

THE PLYMOUTH GUILDHALL COMPETITION.—The Plymouth Town Council are somewhat divided in opinion as to the advisability of proceeding with the proposed Guildhall, and apparently are not quite sure that they have selected the best design after all. At a somewhat stormy meeting held last week, it was resolved, after four hours' discussion, to appoint a committee to proceed at once to the erection of the building, but the plans and time of erection are left to that body, who are to report from time to time to the council. We since hear that the committee have appointed a sub-committee to confer with Messrs. Norman and Hine, the authors of the first premiated design, as to the practicability of so modifying and rearranging their designs as to permit of the introduction of additional features which are deemed desirable. We also hear from a private source that one of the committee is employing an unsuccessful candidate to prepare plans for submission. Our readers will probably hear more about this next week.

CONVALESCENT HOME, SALTBURN-BY-THE-SEA.—During last summer, the promoters of this institution, finding the existing home too small, determined to erect a building adapted for the object on a large scale. Accordingly, plans and resigns were advertised for, 30 guineas being offered for the first competition prize, and 20gs. for the second, all plans, with estimates, to be lodged with the promoters, at Darlington, on or before December 31, 1869. In response to this advertisement, we understand that between sixty and seventy architects have forwarded designs, varying greatly in style, the estimates for the carrying out of which range from £3000 to £20,000. The award will be made in a short time.

CHICAGO, U.S.—The plans of Mr. W.W. Boyington, architect, of Chicago, for the new Iowa State House, estimating the cost at from 1,000,000 dols. to 2,000,000 dols., have been adopted. Thirteen sets of plans were presented.

NEW YORK ART MUSEUM.—The recent movement in New York in behalf of a great Metropolitan Art Museum is so far a success that all now lacking is the money to carry out the original design for a building, adequate to hod and exhibit the treasures of art and antiquity promised for the proposed institution.

Intercommunication.

QUESTIONS.

[1741.]—CHAPELS AND GALLERY CONSTRUCTION.—Will any of your correspondents be kind enough to inform me of a really good work on the above subject, and thus greatly oblige—A YOUNG DRAUGHTSMAN.

[1742.]—FLOORPLATE.—I thank "B. B." for his reply; but he has misunderstood my question. I propose that the flat bar forming the plate should be rivetted together to form one continuous length of 150 feet, and so to act as an iron bond in the wall as well as a floor plate, but I am afraid that evil effects will follow the expansion and contraction of this iron bar 150ft. long. I wish to know whether the superincumbent weight of brickwork above the bar would be sufficient to prevent the iron from varying its length when built in by reason of variations of temperature. —X. M.

[1743.]—LEGAL QUERY.—There is a case reported somewhere, I think, deciding that the presumption of law was that the soil of a private way belonged to the owners of the adjoining land. I am unable to find such a case. Can any reader of THE BUILDING NEWS oblige me by pointing it out? I think it was within 1867-9.—A. B.

[1744.]—THEODOLITE.—I should feel much obliged if the writer of the article in last week's BUILDING NEWS would explain how the number of degrees, minutes, and seconds are read off from a theodolite when it is divided for reading seconds. I am well acquainted with the use of a theodolite when it is used for reading minutes only; when it is divided for seconds, I am puzzled to read them correctly.—A SUBSCRIBER.

[1745.]—THEATRES.—Numerous theatres having been erected so recently as to render it improbable that a collection of their dimensions has yet been made, I should feel obliged to the readers of THE BUILDING NEWS for such reliable particulars of the stage, proscenium, auditorium, &c., of any late examples as they may be good enough to supply.—FOOTLIGHT.

[1746.] — VERBAL ORDERS. — Will any of your readers inform me whether if a contractor executes a verbal order from the architect, he can claim for the extra work? It is usually inserted in specifications that all orders for extra work must be given in writing, but I have hitherto looked upon this as a dead letter. —BUILDER.

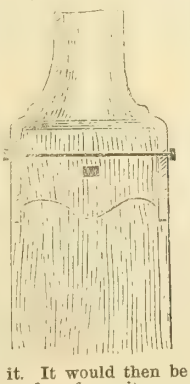
[1747.] — SCARFING BEAMS, — I have to scarf a beam 52ft. in length in three places. As there is to be a heavy central weight, I am not allowed to put the joining on the centre, but must leave a clear space of ten feet there. What would be the best points in the beam to make the joint? The beam itself forms part of a large truss.—BEGINNER.

[1748.]—POSITION OF FONT.—In the planning of churches, the font is placed at the west end, near the entrance. Is this position considered an indispensable part of the arrangements, or might the font be placed elsewhere, say near the north door, should circumstances render it more convenient?—F. T.

[1749.]—STRENGTH OF ROOFS.—I am much obliged to "Carpenter" for his answer to this question, and entirely agree with him that the second sample is the best. "Carpenter," however, says "they are neither of them at all good specimens of a roof truss." Will he point out the defect of the second truss, or sketch one which he may consider preferable? The tie beam is to carry a floor.—COMPARISON.

REPLIES

[1711.]—SUPPORTING CAST IRON PILLARS.—The method of fixing iron pillars upon piles given in your last number has the merit of present security to recommend it. It is, however, rather complex in its method, and open also to the more formidable objection of insecurity, arising from the patent fact that ground damp and atmospheric changes would soon loosen the rusted rivets in an open railway shed, where the frequent concussion of heavy trains and engines would then have the shaky pillars at their mercy, and possibly an extra gale might, ere the company raise the wind for other purposes, shock the public and the shareholders by a catastrophe more disastrous than the first. The simple method is to make the footing of the pillars in one piece with the pillar, and long enough to sit at least 9in. on the head of the pile prepared to receive it. It would then be secured by cross bolts, and protected, as far as its connection with the pile is concerned, from all adverse influences whatsoever. The section illustrates what perhaps hardly needs an illustration.—ROBUN.



[1730.]—NATIONAL SCHOOL PLANS.—The dictates of common sense (sole dictator of custom) would dictate charge for the extraneous drawings.—Dictatorially yours,—DICTATOR.

[1731.]—DRY ROT.—Lay the whole foundations over with a good coating, say 1in. thickness of bituminous concrete, and have the joists creosoted. The latter can be purchased ready creosoted at a very trifling cost above the price of the timber, or the timber can be sent to be done at creosoting works. The best plan is to buy the joists creosoted. If any pieces are sawn off, so as so leave the ends exposed, they should be dipped in tar, for although the timber is impregnated with the preserving material, yet the surface is of course better protected than the inside.—A. A.

[1732.]—HURST'S HANDBOOK.—Your correspondent, "H. A. R.," surely does not expect any two independent calculations to give exactly the same numerical result? I have checked the tables referred to, and find them quite accurate enough for all practical purposes. As an example. The weight of one lineal foot of square iron one inch square is equal to, by the tables, 3·368. Multiplying this by 1·048 it ought to give the weight of a piece of brass of the same dimensions. Performing the multiplication we have 3·368 × 1·048 = 3·529. The tabular number is 3·646, and the difference a little over one ounce. It must be borne in mind that the muitiplier 1·048 is only approximate, and that the correct weight should be always taken from the latter. So also for copper or any other metal.—DRAUGHTSMAN.

[1732.]—"HURST'S ARCHITECTURAL SURVEYOR'S HANDBOOK."—The above-mentioned work is "yet another" instance of human infallibility; one other evidence of the truthfulness of at least portion *primo* of "the poet's" aphoristic distich "To err is human," &c. Without attempting a solution of the mooted mystery, permit me to particularise a somewhat similar incongruity in "Laxton's Price Book," *i.e.*, the weight of lead pipe in table on page 31 agrees with Hurst's table, but varies from that on page 83 of the same work, and await the double elucidation.—F

[1734.]—CONCRETE BUILDINGS.—A favourable but at the same time impartial and practical review of the whole question of concrete buildings will be found in Mr. Reid's late volume, "Concrete and How to Make It."—STUDENT.

[1735.]—DUTIES OF ARCHITECT'S PUPIL.—Albeit it is stated with confidence and implicitly accredited that "Fools rush in where angels fear to tread" the hope is fondly cherished that no obnoxious inference will be deduced and applied in this instance to him who has sufficient temerity to meddle with this vexed question. He ventureth his meddlings in three consecutive paroxysms thus:—1. Ye ideas of ye tyrant; 2. Ye ideas of ye slave; 3. Ye golden mean, after Pecksniff and Co., by no means limited, a long way. 1. In consideration of the payment of a heavy premium *sans* remuneration, to enjoy a usurpation of the legitimate "office boy's" beatific duties—to light fires, sweep out the office, run errands, neither few nor far between, for both office and household trace extensively, square dimensions, fair copy, hold ring end of tape in measuring invariably, and generally labour and fag diurnally and nocturnally without a modicum of thanks, in a workshop lacking respectability or accommodation, for a probationary period of 3 or 4 years, with the prospective bliss of becoming a full-fledged improver for a corresponding period at a munificent weekly stipend of about 10s. drawn upon the Bank of Imagination, and paid at convenience of employer. 2. To tumble into office about 11 o'clock scented, gloved, and jewelled, and in the full and uninterrupted enjoyment of a fragrant Havanah, to vote work "a dem bore," and the governor "a dem muff," to "Tommy Dodd" for bitters, and recede or vacate to imbibe the same, returning at a period unknown, or in time to leave for a two hour dinner, to while away the interregnum (close at 4) in the most suggestive, congenial, and convivial manner with a decided *penchant* for billiards, and "last but not least" by any manner of means, to draw a princely salary "upon the nail." 3. To give, in comfortable quarters, fair time and attention, with accuracy, promptitude, tact, and urbanity, to employer's interests and own improvement, mutually enhancing either; to propound queries and receive courteous and correct replies on all matters of import, however trivial; to have every reasonable facility for study and thorough induction of geometry, drawing, detail, perspective, geometrical, isometrical or free-hand, shading, colouring, mapping, surveying, levelling, building and other construction, quantity surveying, setting out buildings, measuring up work, pricing, &c., &c., either by study, practice, or association, officially or otherwise; to have relief from the incurrence of expense in execution of any duty; to receive immunity from any drudgery appertaining to the social status of an office boy, and be awarded thanks either orally or substantially for the performance of any matter of supererogation, and finally to receive so much attention and tuition, which, if deposited in good soil, and duly irrigated, will, with talent, assiduity, and undivided application both during and after office hours, will eventually attain the acme of perfection, so ably defined by Gwilt in his "Encyclopœdia" (Architect), and thereby tending to facilitate the approximation of that "consumation so devoutly to be wished" —an architectural millenium.—F.

[1735.]—DUTIES OF ARCHITECTS' PUPILS.—The remarks of "G. K." in regard to articled pupils and their duties are not generally what would be understood as strictly in conformity with the practice of the profession. In the first place he says that pupils are not obliged to attend office regularly; but this is absurd, as in all articles it is specified what time he is to come, and how long to stop in the office, and the premium paid is generally considered for the privilege of being in the office and learning what he can while he does his master's work. He cannot absent himself from office without the permission of the master; even if he stops away to learn his profession better than he could do at the office, or to go over buildings, it would

be wrong to do it without asking his master if he may do it. As to running errands, if he does not like he should refuse to do it.—STUDENT.

[1735.] -DUTIES OF ARCHITECTS' PUPILS.—As one of the class interested, I could have wished for a more satisfactory reply to that contained in your journal of 14th inst. There ought, I think, to be a definite minimum time allowed for the pupil's own private study, and I agree with your former correspondent that evenings are not sufficient for such, and, moreover, do not in many cases answer the required purpose, as, for instance, in outdoor sketching, &c. I maintain also that whereas it is provided by the articles that the pupil shall be taught his profession "in all its branches" (which means, as I take it, that he shall have opportunity afforded for such), he ought not to be satiated with one particular branch, to the exclusion of others, as is too frequently the case. The Institute, in this matter, treats us with silent contempt, nor would it, I think, even if appealed to, break silence on the subject. Next to the opinion of the Institute, I am sure yours will be most esteemed by the profession; let me therefore hope that your next number will coniain the opinion of your editorial "we" on this subject.—PUPIL.

[1735.]—DUTIES OF ARCHITECTS' PUPILS.—The reply of "J. K." is certainly very "funny" and not at all calculated to throw light on the subject. Permit me to give an extract from my articles, *obeying* which I found to be the best policy:—"To obey all his master's commands, and not to absent himself from the office during office hours on any pretence whatsoever, save illness." "J. K." is certainly too sweeping in his assertion that a pupil "ought to have no particular work assigned to him," as it is only by paying "particular" attention to anything we can ever hope to become proficient at it. With regard to "outdoor study," I presume the master will give his pupil opportunities for studying the works in progress; but all these matters must, from the nature of the case, be left to the decision of the master. If, at the expiration of his term of apprenticeship, the pupil has *bona fide* grounds for complaint, of course he has the means of redress by an action at law for damages for breach of contract, but *during* the apprenticeship, the pupil must obey his master.—W. BUTLER, Sandymount.

[1738.]—STOVE.—In reply to the question which appeared in the BUILDING NEWS of Jan. 14, I beg to state that the stove most suitable for the purpose is that manufactured by Messrs. Musgrave, of Belfast. Of course there must be a *descending* concealed flue. I presume "J. H." wishes to do away with all *appearance* of a flue.—W. BUTLER, 123, Strand-road, Sandymount, co. Dublin.

STAINED GLASS.

BLEXHAM.—A new stained window has been erected in the chancel of S. Mary's Church, Blexham, by Morris and Co., of Queen's-square, London. The subject is part of the Te Deum.

STATUES, MEMORIALS, &c.

WARWICK.—There has recently been erected in S. Mary's Church, Warwick, a monument to the memory of the late Mr. Alexander Campbell, eldest son of the late General Campbell. The monument is the work of Mr. William Brodie, R.S.A., Edinburgh. It consists of a tablet and medallion of Carrara marble fixed upon a background composed of a slab of black marble in the shape of a pointed arch. The tablet is supported on two trusses in the form of cherub heads. It has a neatly moulded base and cornice, and over the latter falls a scroll bearing an inscription. The monument measures 9ft. in height and 4½ft. in width.

THE MARQUIS OF WESTMINSTER'S STATUE AT CHESTER.—It may be remembered that a short time since a flaw was reported in the marble statue, by Thornycroft, of the Marquis of Westminster, at Chester. At the Chester council on Wednesday, some proceedings which had been taken with reference to the defect were referred to, and the sculptor's explanation of the flaw was that a piece had been let into the figure at the left shoulder. Mr. Thornycroft has stated to a committee that such a practice was not uncommon with sculptors, and that the block, save that defect, was so excellent that he did not consider it worth while to wait for another block, which he could have obtained from the merchant, according to his contract, without additional cost. It was reported that an arrangement had been come to with Mr. Thornycroft to make good any damage arising from the insertion of the block in the shoulder. It is proposed to fill up the crack with cement.

THE INVENTOR OF THE SCREW PROPELLER.—A handsome monument of Carrara marble, 10ft. in height, has just been erected to the memory of Mr. John Swan, the inventor of the above mode of marine propulsion. The monument, which is in a conspicuous part of Abney Park Cemetery, bears the following inscription:—"In loving remembrance of John Swan, engineer, of 82, Mansfield-street, Kingsland-road, London (formerly of Deptford), born August 22nd, 1787, at Coldingham, Berwickshire; died February 1st, 1869, aged 81 years. 'Not gone from memory, not gone from love, but gone to his Father's house above.'"

A STATUE FOR LIVERPOOL.—A Roman correspondent of the *Athenæum* alludes as follows to the statue which he inspected in the studio of Tenerani, the sculptor, recently described:—"The Angel of the Resurrection, perhaps one of the grandest conceptions of Tenerani, has been so often noticed that I should have scarcely alluded to it had I not seen a quasi-repetition of it now being executed for Mr. William Rathbone, of Liverpool. It is to be dedicated to the memory of Miss Jones, daughter of Colonel Jones, who died of typhus fever while attending fever hospitals. I call it a quasi-repetition, because it is the head only which is copied from the original, and yet it is the head and the sublime expression of the face which fix and absorb the attention. The angel, who is seated, is draped; a trumpet held by the right hand lies across the knees, whilst the left hand rests on the book, which reposes on the knees. As to the expression of the face, there is a combination in it of sweetness, serenity, and a depth of conviction which gives assurance of everlasting life. A modification of this beautiful design, in alto-relievo, was to be sent off on the following morning to Ancona. It has a glory round the head; and the plumage of the wings is so delicately executed that one almost suspends one's breath for fear of fluttering them. The first work, after these smaller designs, was executed, I believe, for Mr. Barton, whilst the great original was a standing figure, and immortalises the memory of the Duchess of Lauti."

MISS DURANT'S BUST OF RUTH.—Barbedienne, the well-known Parisian producer of art bronzes, has secured the right of executing, both in life size and small reductions, the bust of Ruth, by Miss Durant, which was so highly admired in the Academy Exhibition last summer. The copies in bronze will be brought out in the spring.

WATER SUPPLY AND SANITARY MATTERS.

PURE WATER!—Melbourne derives a considerable part of its water supply from a reservoir in the neighbourhood, named Yan Yean. A quick-sighted physician, who has brought the subject before the Medical Society of Victoria, has discovered that the whole drainage of a township, after creeping through a foul swamp, flows by three outlets into the main feeder of the reservoir.

THE HASTINGS SEWERAGE.—At a recent meeting of the Hastings Local Board, Mr. Rock, the leading promoter of Noome and Co.'s system of deodorising sewage, applied for a lease of the land on which his machinery is erected. He explained that he had been at an outlay of between £2000 and £3000 in experiments, and had got no return yet, and that the persons who had now joined him believed that it would be necessary to spend £2000 more. A lease was granted for 21 years, at £1 a year, with the right to use the sewage. At the same meeting, an application of the Committee of the British Association on the Utilisation of Sewage, for a donation in aid of the experiments which they are making to utilise sewage, was read. It was proposed to subscribe five guineas, but the motion was lost by one vote, there being nine for and 10 against.

THAMES SEWERAGE.—We (*British Medical Journal*) understand that the Board of Conservators of the river Thames intend to apply to Parliament next session for power (amongst other things) to prohibit the discharge of solid matter in the river Thames from the sewers and drains of the Metropolitan Board of Works at Barking and Crossness, and from any other sewer or drain belonging to them, or any other body of persons; and to compel the Metropolitan Board of Works to deodorise, or otherwise render innocuous, the effluent waters or other liquid matters allowed to flow into the river.

THE SOUTHERN SUBURBS.—Complaints of the water supply come from the outlying localities of Streatham, Balham, and Tooting, and it has been in contemplation to utilise for the lower levels of that neighbourhood some existing artesian wells, but these not being available for the higher levels, those districts must still be dependent on the Water Company for their supply.

LAND AND BUILDING SOCIETIES.

ASHBORNE.—A new building society has just been formed at Ashborne, Derbyshire, under the name of the Ashborne Permanent Benefit Building Society.

RYE.—The 21st annual meeting of the Rye Permanent Benefit Building Society was held at Rye on Thursday week. The report, which was of a satisfactory nature, was adopted.

MIDDLESBOROUGH.—The monthly meeting of the Middlesborough, Redcar, Saltburn-by-the-Sea, and Cleveland District Permanent Benefit Building Society was held at Middlesborough on Wednesday week, when the receipts amounted to £3375 14s. 6d., and many new shareholders were enrolled. The directors, at a late special meeting, declared a dividend of £6 10s. per cent. on all paid-up shares, payable on the second Wednesday in March next.

Our Office Table.

THE THAMES EMBANKMENT.—The Parks Committee of the Metropolitan Board of Works has recommended that Mr. M'Kenzie be employed to assist in the preparation of the plans for planting on the plots of ground on the Thames Embankment, North, to purchase the necessary trees and shrubs, and to superintend the works of laying out and planting, and that the sum of two hundred guineas be paid to him for performing those services, such sum to include all travelling and other expenses.

BERKHAMPSTEAD COMMON.—It will be remembered how, a year or two ago, Mr. Augustus Smith, M.P., took a party of labourers by special train to Berkhampstead, and threw down a fence which Earl Brownlow had elaborately put up for the purpose of enclosing a portion of Berkhampstead Common. The dispute got into the law courts, and the Master of the Rolls has now decided that the late earl had no right to the land, and that the common is, in fact, public property.

BESSEMER RAILS.—The reduction in the amount of royalty on Bessemer's patent, which will take effect on the 12th proximo, will doubtless have an important effect in increasing the use of steel in the permanent ways and otherwise in the working of the railways of the country. The chief patent expires on that date. There are several supplementary patents connected with the process which will continue in force, but the royalty will be reduced to the moderate sum of 2s. 6d. per ton. We understand that all the manufacturers under the old system of royalties have, without exception, agreed to use the supplementary patent, and will continue still to manufacture under the reduced royalties of Mr. Bessemer's process. This reduction in cost of the steel rails will be a great boon to the railway companies, diminishing the expenditure under the head of steel rails very largely, and permitting their being more extensively adopted in relaying portions of the existing road. A very great saving in the heavy cost of renewals of permanent way will also be thus effected. In view of the forthcoming application of the tramway system to the requirements of towns this reduction in the price of steel rails is most opportune.

INDIAN ARCHITECTURE AND ORNAMENT.—At the usual weekly meeting of the Birmingham Society of Artisans last Saturday, Mr. W. T. Sweyn read a paper on the "Ancient Commerce, Architecture, and Ornament of India." After describing the early commerce of India with other ancient countries, the lecturer alluded to the character of its architecture, remarking, *en passant*, that there was a scarcity of information respecting it. He gave an interesting description of the temples cut out of the solid rock, and other works of antiquity, and of the varied manufactures of the great English possessions in the East. It was a remarkable fact, he said, that all the nations of antiquity strictly adhered to the principles observable in the growth of plants. Indian ornament observed all the laws of adaptation, repetition, alternation, and radiation, at the same time presenting variety to an almost infinite degree. It was constructive in decoration, geometrical in foundation, and symbolic of the beauty of woman. It always sprang from one root or centre, and the subdivisions of space were most carefully attended to. Savage and half civilised nations presented in their decorative productions a freshness, combined with variety of purpose, such as could not be found amongst the more civilised nations of the world. The reason of this was that they derived their inspiration direct from nature, uncontrolled by the errors of man's devices.

KING'S COLLEGE, LONDON.—The Council give notice that evening lectures will be delivered at King's College, Strand, during the ensuing season, as follows:—Feb. 1, Professor J. E. Thorold Rogers, M.A., of Oxford, on "Louis XI., his Policy and Times." Tuesday, March 1, by the Rev. R. Willis, M.A., F.R.S., Jacksonian Professor of the University of Cambridge, on "The Architectural History of the Church of the Holy Sepulchre at Jerusalem." Tuesday, April 5, by Professor W. A. Miller, M.D., F.R.S., "On Some of the Latest Discoveries in Spectrum Analysis." Tuesday, May 3, by Sir Bartle Frere, K.C.B., "On India as a Career for Men of all Classes and Professions." Tuesday, June 7, by the Rev. Alfred Barry, D.D., Principal, "On the Relative Claims of Language and Physical Science in Education." Dr. Guy, F.R.S., the newly-elected Professor of Hygiene, will give his introductory lecture on the evening of Monday, the 31st of January.

THE OLDEST HOUSE IN THE UNITED STATES—At the American Architects' meeting, recently held in New York, it was stated that perhaps the oldest house in the United States is in Third Avenue, South Brooklyn, near the Greenwood Cemetery. It was constructed of Holland bricks, and bears the date of 1666 in iron letters on the front.

NEW PUBLIC HALL FOR TUNBRIDGE WELLS.—A new public hall for Tunbridge Wells will shortly be commenced. The undertaking will be carried out by a joint stock company, with a capital of £10,000, of which £8630 has been already subscribed. In addition to the hall proper will be reading, club, smoking, and billiard rooms, shops, and cellarage.

THE NEW BRITISH INSTITUTION.—One more exhibition of works of living artists is announced to be held in Old Bond-street, London, where a spring exhibition is also in course of formation. The latest announcement is called by its promoters the New British Institution, and is to be held in a gallery near the Piccadilly end of the street. The prospectus mentions among artists who will exhibit, Mr. Cope, R.A., Mr. Goodall, R.A., Mr. Faed, R.A., Mr. Saul, R.A., Mr. Richmond, R.A.; also among Associates of the Academy, Messrs. Lejeune, Dobson, Frost, Graham, Houston, and Archer; and among no less important outsiders, Mr. T. J. Linnell and Mr. W. Linnell, Mr. Barnes, Mr. P. R. Morris, Mr. Beavis, Mr. Sandys, and many others. That the formation of these new associations is a necessity of the limited space at the Academy, even the President may perhaps now be brought to perceive.

AGRICULTURAL LAND DRAINAGE. — Mr. Mechi, the well-known authority in agricultural matters, wonders why so little of the plethora of capital is employed in field improvements. There are several land drainage and land improvement companies ready and willing to invest capital in necessary agricultural improvements, but there is little demand for it, although at least £100,000,000 could be very profitably employed in drainage alone. In Mr. Mechi's neighbourhood a good deal of permanent drainage has been effected by these companies, at an annual cost of 7s. 6d. per acre. Yet people do not see it. Some people think it is of no use to drain the heavy clays or tenacious tile earths, because the water cannot pass through them. "This is a great mistake; for even at 40ft. and 50ft. apart, and 5ft. deep, my drains on such soils are discharging abundantly, although made a quarter of a century ago."

Chips.

The Kilkenny Archæological Association has received permission from the Queen to call itself in future "The Royal Historical and Archæological Association of Ireland." The society is greatly enlarged, and promises to do much work.

The Woolwich Local Board of Health have come to the conclusion that the purchase of a street roller is preferable to hiring one, but they have agreed to hire the Plumstead roller to see how that system of road-making works.

A correspondent of the "Guardian" states that Mr. C. Mathews was originally intended for an architect, and was a pupil of the first Pugin.

The prize for the best essay on "The Use and Abuse of Music in Public Worship, and the Danger of Introducing Painted Windows in Churches," has been awarded to the Rev. John Gritton, Secretary to the Lord's Day Observance Society. Did he write the essay on the "Lord's Day," we wonder? His secretarial labours should have fully engaged him during the rest of the week.

A wire tramway, five miles long, has just been laid down over the Downs at Brighton, starting from the rear of the Black Rock gas works. The wire is supported by pulleys. At one end it passes over a drum, worked by a portable steam engine, and by this means it is driven at a speed of from four to six miles an hour. Boxes of merchandise can be attached to the rope, which, as it moves, draws them along. The line is an experimental one.

The parish church of Stonham Aspal, Suffolk, is about to be restored. It is proposed first to supplant the pews by benches, and to remove a cumbrous gallery at the west end, after which the roof (now ceiled with plaster) and other portions of the sacred edifice will undergo restoration.

Mr. Basil Champneys wishes us to state that the cost of S. Luke's Church, Kentish Town, is £10,500, and not £14,000, as stated by us last week.

The death is announced of Mr. Murray Marshall, a very extensive timber merchant and contractor, well known in Surrey and the adjoining counties.

Mr. Henry Hewitt Bridgeman has been elected assistant-surveyor of St. Pancras. There were 24 candidates. Mr. Bridgeman was elected by 19 votes.

Active measures are being taken to establish the proposed Architectural Art classes. The joint committee appointed by the various societies have drawn up a programme, and we understand that immediate steps will be taken to prepare the upper floor of the Architectural Museum in Bowling-street, Westminster, for the reception of the school.

The members of the Architectural Association who propose to go up for the Voluntary Examination have agreed to form themselves into a class for mutual instruction in the different subjects. The examination will take place early in May, and it is to be hoped that the recent concessions made by the Institute will lead an increased number of students to present themselves. The Voluntary Examination class will meet on alternate Monday evenings at 6.30, in the rooms of the Association, at 9, Conduit-street.

The exhibition of the works of the old masters, at the Royal Academy, is proving financially a decided success. We believe that the profits resulting from the exhibition will be devoted to charitable and special art purposes. The galleries will close on the 28th of February, in order to prepare for the annual exhibition in May.

A new room has just been opened in the South Kensington Museum, containing the collection of pictures, engravings and books bequeathed by the late Reverend Alexander Dyce. It was strictly stipulated in his will that these works should be kept apart from the other objects in the museum.

MEETINGS FOR THE ENSUING WEEK.

MONDAY.—Institution of Surveyors. Adjourned discussion on Mr. Hope's Paper, "On the Distribution and Use of Town Sewage. 8.
" Entomological Society. Anniversary Meeting. 7.
TUESDAY.—Institution of Civil Engineers. Renewed discussion on Mr. Grantham's Paper, "On Ocean Steam Navigation. 8.
" Royal Institution. "On the Architecture of the Human Body." By Professor Humphrey, M.D., F.R.S. 3.
WEDNESDAY.—Civil and Mechanical Engineers' Society. Continued discussion on Mr. Bancroft's Paper. "On the Renewal of King's Cross Station Roof. 7.30.
" Society of Arts On the Modes of Reading in use by the Blind, and the Means for arriving at Uniformity. By Thos. Armitage, Esq., M.D. 8.
THURSDAY.—Royal Institution. "On the Chemistry of Vegetable Productions." By Professor Odling, F.R.S. 3.
" Society for the Encouragement of the Fine Arts. First Conversazione of the Season, at the Female School of Art, 43, Queen-square, Bloomsbury.
" Society of Antiquaries. 8.30.
FRIDAY.—Royal Institution. On Professor Graham's Scientific Works. By Professor Odling, F.R.S. 9.
SATURDAY.—Royal Institution. On Meteorology. By Robert Scott, Esq., M.A. 3.

Trade News.

WAGES MOVEMENT.

WAGES AND HOURS OF WORK IN THE VARIOUS TOWNS OF SCOTLAND.—The following list appears in the eighth annual report of the Associated Carpenters and Joiners of Scotland:—

	Hours.	Wages.
Aberdeen	57	22s. per week
Airdrie	57	26s. "
Alexandria	57	27s. to 30s.
Alloa, house	57	4½d. per hour
" boats	57	
Arbroath	57	21s. to 22s.
Ayr	57	5½d. per hour
Blairgowrie	51	19s. to 23s.
Bonnyrigg	56	5½d. per hour
Broughty Ferry	51	5d. and 5½d. per hour
Campbeltown	60	24s. per week
Castle Douglas	60	20s. "
Clyde	57	28s. to 29s.
	60	per 60 hours
Coatbridge	57	5½d. per hour
Crieff	57	20s. to 21s.
Dalkeith	51	5½d. per hour
Dumbarton	57	5½d. "
	60	26s. to 27s.
Dumfries	57	5½d. per hour
Dundee	51	24s. to 25s. 6d.
Dunfermline	57	20s. per week
Dunoon	57	6½d. per hour
Edinburgh	51	6d. to 6½d. per hour
Elgin	57	4½d. per hour
Falkirk	57	5d. "
Forfar	57	20s. to 21s.
Forres	57	18s. to 20s.
Galashiels	57	5½d. per hour
Glasgow	57	6d. "
Govan	57	27s. per week
Greenock	57	house, 6d. per hour
		ships, 26s. to 28s.
Hamilton	57	5½d. per hour
Hawick	57	5d. "
Inverness	57	4½d. to 5d. per hour
Johnstone	60	25s. to 26s.
Kilmarnock	57-58	23s. to 25s.
Kirkcaldy	57	4½d. per hour
Kirkcudbright	57	20s. per week
Lanark	57	22s. "
Leith	57	6d. per hour
Montrose	57	21s. per week
Musselburgh	51-57	5d. to 6d. per hour
Nairn	57	19s. to 20s.
Oban	57	5½d. per hour
Paisley	57	6d. per hour
Partick	57	5½d. to 6d. per hour
Perth	57	23s. 9d. to 24s.
Port Glasgow	57-60	24s. to 28s.
Portobello	51	5½d. to 6d. per hour
Renfrew	57-60	26s. to 27s.
Rothsay	57	5½d. per hour
St. Andrews	57	4½d. to 5d. per hour
Stirling	57	5d. per hour
Tayport	57	22s. per week
Uddingston	57-60	26s. to 28s.
Wishaw	60	25s. per week

TENDERS.

BASINGSTOKE.—For three new houses and shops, London-street, Basingstoke for Mr. Owen. Messrs. G. B. Mussellwhite, architect. Quantities supplied exclusive of old materials of properties pulled down:—

	For general trades—plumber, painter, and glazier excepted.	Plumber, painter, and glazier.
Jennings	£269 5 6	£161 0 0
Budden	125[illegible] 0 0	
Pistel	1237 13 0	162 10 0
Musselwhite & Sons	1220 0 0	
Pelham and Co. (ac.)	1191 1 10	168 0 0
Glover		159 18 0
Watson		137 10 0
Fisher		130 9 6
Palmer (accepted)		121 10 0

BRITON FERRY.—For building 3 houses in London-road for Mr. Ritson. Mr. H. Francis Clarke, architect:
John Thomas £576 2
Isaac George 560 10

BRITON FERRY.—For building 7 houses in Regent-street for Mr. Howells. Mr. H. Francis Clarke, architect:—
Isaac George £952 0
John Thomas 931 0
J. C. Rees 813 15
George Treharne 780 0

CITY.—For building warehouse, New-street-square, and Plough-court, City for Messrs. Leighton, Son, and Hodge. Messrs. Wright and Dresser, architects, 5, Parliament-street, Westminster. Tendering on priced schedule, prepared by architects:—

	Time months	Pr. Cnt. above.	Pr. Cnt. below.	Credit for old Materls
Clemence	6	10	—	£128
Mundy	4	10	—	30
Pritchard	6	7	—	105
Howard	5	—	—	250
Holland & Hannen	6	—	6 Brick laying exepted.	400
Myers and Sons	7½	—	7½	50
Keeble	5½	—	5	150
Ashby & Sons (ac.)	3½	—	5	600

NEATH.—For alterations to shop in New-street for Mr. Curtis. Mr. H. Francis Clarke, architect:—
J. Jaynes £153 0
J. Thomas 152 0
J. C. Rees 95 7

STRATFORD, BOW.—For the erection of a public mortuary and *post mortem* room for the vestry of the parish of S. Mary. Messrs. Hills and Fletcher, architects. Quantities were not supplied:—
Webb and Son (accepted) £210

COMPETITION.

INDIA OFFICE. — A competitive examination for forty appointments in the engineer establishment of the Public Works Department in India, will be held in July. W. J. Thornton, secretary.

CONTRACTS OPEN FOR BUILDING ESTIMATES.

PEST, Feb. 7, 1870.—For the supply of slates and for covering the roofs of the city slaughterhouses. Herr Julius Hennicke, architect, Berlin, Neue Börse.

BRADFIELD WORKHOUSE, NEAR READING, Feb. 1. For the supply of good water.—J. C. Pinniger, clerk, Newbury.

ISLINGTON, Feb. 1.—For the erection of two spires at S. John's Church. Mr. A. J. C. Scoles, architect Crofton Lodge, Masbro'-road, Hammersmith.

WALTHAM HOLY CROSS BURIAL BOARD, Jan. 24.—For paving and fencing the pathway leading through the churchyard. Mr. C. Chapman, architect 51, Bishopsgate-street, Within.

GREENOCK HARBOUR, Jan. 25.—For the construction of certain works at Garvel-park. J. K. Gray, Town Clerk, Council Chambers, Greenock.

CHATHAM DOCKYARD EXTENSION, Jan. 25.—For the supply to Chatham Dockyard of carpenters' and other tools. Director of Works Department, Admiralty, Spring Gardens-terrace, London, S.W.

SOUTHSEA BATHS, Jan. 24.—Contract No. 2.—For the supply of boilers, engine, pumps, pipes, &c., and for heating baths and assembly rooms at the above building. Messrs. Davis and Emanuel, architects, 2, Finsbury-circus, E.C.

WAR DEPARTMENT CONTRACTS, WOOLWICH, February 3.—For the erection of an additional drying room at the Herbert Hospital. Col. W. Driscoll Gossett, Royal Engineer Office, Woolwich.

LEEDS, January 29.—For the erection of a warehouse, shop, and house, in Boar-lane. H. E. Brown, Architect, Beulah House, Harrogate.

LEEDS.—January 29.—For the erection of a pair of semi-detached villas, on Headingley-hill. Thomas Ambler, Architect, 9, Park-place, Leeds.

FOR fitting up a railway arch as a place of worship. M. Sparrow, 42, Camberwell-road, S.

MIRFIELD, January 26.—For the erection of a villa residence, premises, and boundary walling, at Mirfield. T. W. Helliwell, architect, Brighouse.

LLANGWM, near Usk, February 1.—For the erection of school-buildings, at Llangwm. John P. Seddon, Architect, 12, Park-street, Westminster.

CHICHESTER CATTLE MARKET, FEB. 15.—Contract No. 1.—For the laying out of the site of a cattle market, of about 6 acres in extent; comprising the metalling of the pens, standings, and roads, the construction of the drains, boundary walls, and entrance gates, and the removal and alteration of certain houses on the site of the market, together with the formation of a new road, and the diversion and covering of a portion of the Lavant course, and other works connected therewith. Edward Arnold, Town Clerk, Chichester.

CHICHESTER CATTLE MARKET, FEB. 15.—Contract No. 2.—For the supply and erection of wrought and cast ironwork of the pens for sheep and pigs, and the standings for cattle, together with the wrought-iron tethering-rings for horses and cattle. Edward Arnold, Town Clerk, Chichester.

CROYDON LOCAL BOARD OF HEALTH, JAN. 31.—For the construction of earthenware and brick sewers, in the parish of Croydon, during the ensuing twelve months. R. Cheeswright, Clerk, Town Hall, Croydon.

GLOUCESTER, JAN. 29.—For the erection of a Wesleyan Chapel at Ryecroft. Mr. A. W. Maberley, architect, 1, Brunswick-road, Gloucester.

WYKE WATERWORKS COMPANY (LIMITED) AND SCHOLES SEWER AUTHORITY. JAN. 24.—For excavating, levelling, and laying pipes, valves, hydrants, &c., from Bankfoot, in the parish of Bowling, and within the corporation of Bradford, to Storr Hill Bottom, in the parish of Wyke, comprising about 2400 yards of 4-inch pipe more or less. Tenders; "The Secretary of the Wyke Waterworks Company."

WISBECH, JAN. 24.—For the supply and fixing of 1250 yards of wrought-iron continuous flat bar fencing, with gates, &c. Chas. Mumford, C.E., surveyor to the Board of Health, 4, Market-street, Wisbech.

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BANKRUPTS.

(To Surrender at Basinghall-street.)

Joseph Bernadat, Leadenhall-street, hairdresser, Jan. 25, at 2—William Rayner, Walpole-street, Newcross, builder, Feb. 2, at 12.

(To Surrender in the Country.)

George Allin, Uttoxeter, auctioner and surveyor, Jan. 28, at 12.—Robert James, Manchester, joiner, Feb. 9, at 1—William Mansfield, Birmingham, brick manufacturer, Jan. 28, at 12—Robert Askew, Great Ponton, Lincolnshire, builder, Jan. 25, at 11—William Credland, Handsworth, Yorkshire, varnish manufacturer, Jan. 26, at 11—William Freeman and Thomas Yeoman Freeman, Ottley, stonemasons, Jan. 24, at 11—Joseph Mickmahon, Scarborough, builder, Jan. 26, at 11—John Moore, Pickering, district road surveyor, Jan. 24, at 11—Henry Pycock, Leeds, joiner, Jan. 24 at 11—William Shepherdson, Hull, joiner, Jan. 27, at 11.

SITTINGS FOR LAST EXAMINATION.

May 20, R. Douglas, Hounslow, gasfitter—May 20, E. Cordery, William-terrace, Shepherd's bush, builder—May 20, E. James, Orchard-terrace, Shepherd's-bush, gasfitter—May 20, J. and W. J. Winter, Old Kent-road, decorators—May 20, H. E. Tomes, Swanbroke-road, Notting-hill, builder—May 20, J. B. Beckwith, Bermondsey-street, carpenter—Feb. 24, G. Rutter, Wandsworth, builder—Feb. 3, E. Cordery, Cunningham-road, Hammersmith, builder—Feb. 17, J. M'Carthy, Reading, plumber—May 13, T. S. Russell, Coburg-road, Old Kent-road, builder—May 13, H. S. Bond, Little Europa-place, Battersea, stone mason—May 20, J. W. Raine, Carter-lane, City, builder—Feb. 15, T. Hudson, Hendon, plumber and glazier—Feb. 15, T. Greenham, Broke-road, Dalston, builder—May 13, T. B. Smith, Larkall-rise, Clapham, builder—May 13, G. Brown, Pomeroy-street, Old Kent-road, builder—May 13, W. H. Rackett, Penge, builder—Feb. 8, T. Pearce, Lancaster-road, Notting-hill, builder—Feb. 16, J. Tassell, Upchurch, Kent, brickmaker—Jan. 31, J. Nelles, Newcastle-upon-Tyne, builder—Feb. 16, J. Ambler, Balsall-heath, journeyman carpenter—Feb. 16, H. Fenn, Birmingham, engineer—Jan. 29, G. Stanton, Liverpool, builder—Feb. 15, W. Deakin, Hulme, stone mason—Feb. 3, B. Rowe, Burslem, plumber and glazier—Feb. 17, W. Margerison, Brampton, Derbyshire, salter—Jan. 26, T. V. Leverage, Cambridge, carpenter—Feb. 14, J. Olding, Southampton-house, decorator—Feb. 11, W. Robinson, Barnsley, painter—Feb. 23, T. Roberts, Plymouth, painter—Feb 24, Z. Hammond, Old Saint's-road, Notting-hill, house decorator—Feb. 9, W. Wright, West-street, Cambridge-heath, contractor—Feb. 9, W. Gray, Manchester-street, Latimer-road, Shepherd's-bush, painter—Feb. 3, J. Kilshaw, Bootle, builder—Feb. 4, J. Conway, St. Asaph, builder—Feb. 4, J. and T. Parnell, Great Crosby, near Liverpool, builders—Feb. 15, W. Dransfield, Halifax, contractor—Feb. 9, J. Riley, Manchester, painter—Feb. 16, D. Wicks, Shinfield, Berks, carpenter—Jan. 28, J. Travis, Treeton, Yorkshire, stone mason—Feb. 8, J. Hoare, Great Canford, contractor—Feb. 10, M. Ryder, East Boldon, near Sunderland, joiner—Feb. 17, T. Hyde, Chalvey, near Slough, stonemason—Feb. 11, J. Thompson, Bristol, mason—Feb. 16, W. H. Thomas, Birmingham, carpenter.

DIVIDEND MEETINGS.

Feb. 2, J. Ward, Bolton, contractor—Feb. 9, J. Glenn, Liverpool-road, Islington, builder—Feb. 9, M. Beale, Gray-street, Poplar, iron and brass founder.

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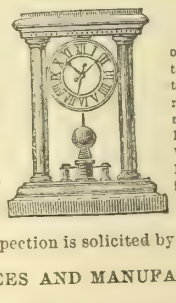
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THE BUILDING NEWS.

LONDON, FRIDAY, JANUARY 28, 1870.

THE POSITION OF ARCHITECTURE AT THE ROYAL ACADEMY.

THE assurance that the Royal Academy still recognise the South-East Gallery as destined for architecture, conveyed in the letter of Sidney Smirke, R.A. to the Royal Institute of British Architects, read by Mr. Seddon, the hon. secretary, at the last ordinary general meeting, may be considered to a certain extent satisfactory, even though qualified as it was by the statement "that in the event of the architectural drawings sent not being sufficient in number and merit to occupy the whole of that gallery, the committee would retain the power of supplementing the exhibition with other drawings or works which might harmonise with the architectural drawings." What is, however, urgently needed in addition is that the selection or rejection of architectural drawings should be controlled by one of the members of the Academy connected with that profession, and not by the usual hangers, who are painters, possessing, alas! but little sympathy with or knowledge of this their sister art. Many drawings, we fear, have been, and are still likely to be set aside, because not in the the opinion of those gentlemen sufficiently pictorial to adorn their walls, which have ample merit of another kind to entitle them to admission to the Academy. We are unable to state—for the facts were somewhat jealously concealed—how many architectural drawings were rejected upon the last occasion. It was alleged that the paucity of good drawings sent was the cause that none whatever were hung in the gallery promised to be appropriated to architecture, and that so few found their way into that space which was allowed as a substitute; and yet it is well-known that many good drawings were rejected, as several of these were exhibited at the last annual *conversazione* of the Institute of Architects, some of which, at any rate, were drawings entitled to exhibition at the Academy, being representations of important works in progress by architects of eminence, skilfully and pictorially drawn and coloured, and far superior to many that were admitted and hung last year. Now, we hold that if one such drawing were rejected, the Academy did not deal justly with the profession, and we earnestly trust that the reiterated promise, now conveyed by authority through Mr. Smirke, will be more faithfully kept than we consider the former one was. We are quite willing to allow that much ought to be conceded as excusing the conduct of the hangers of last year, who were exceedingly pressed for time in consequence of the works to the building having to be carried on up to the last moment, and to the lack of experience as to the capacity of the new galleries, coupled with the overwrought expectations of the painters, who had forwarded so many more pictures than could possibly be hung. For the sacrifice of the architects on that occasion, therefore, we are, as we have said, willing to make great excuse, but we cannot conceal the fact that they were egregiously sacrificed in a manner which we trust may not recur.

One other point also we would name, while seeking justice for the profession at the hands of their brother artists, which is that the architects in the Academy should imitate the graceful reserve, in not securing to themselves the most numerous and best positions for their works, which characterised last year several eminent painters, notably Mr. Leighton, one of the hangers. It is not yet forgotten that while many meritorious architectural drawings were altogether excluded, and others, though admitted, hung too high for inspection, that an undue space was occupied by mere competition drawings that bore the name of the son of an architectural Royal Academician: an error of judgment which we trust will not be repeated. In conclusion, we would call upon the profession to do their part towards rendering the promised architectural room of 1870 worthy of its reservation for their works, by sending in drawings in number and merit such as to preclude any necessity for their being supplemented by others supposed to harmonise with them.

THE ARCHITECTURAL ASSOCIATION.

THE commencement of another year presents us with a very suitable occasion for placing before our readers a few facts connected with the working and management of this most successful society. We are the more induced to do so from the fact that although the books of the Association bear the names of more than 600 of the younger members of the profession, we are convinced that the various classes for mutual instruction would, if their object were better known, be even more numerously attended than they are at present.

The "Journal" for the present session (which opened in October last) contains the annual report of the committee, and sets forth very clearly the aims and object of the society. From the report we gather that in addition to the papers read before the Association (which have in most cases appeared in our pages) periodical visits have been paid by the members to buildings in progress, and that during the past year they have thus inspected the following works:—Her Majesty's Theatre, Grosvenor Mansions, Columbia Market, Bible Society's House, the new churches of S. Saviour, S. Chad, S. Columbo, and S. Michael and All Angels in Shoreditch, the Albert Hall of Arts and Sciences, Dulwich College, the Royal Academy, the London University Buildings, Drapers' Hall, the Holborn Viaduct, Blackfriar's Bridge, and Hampton Court Palace. This list, which includes nearly every new building of importance in the metropolis, will give an idea of the valuable information which must have been acquired by students who have availed themselves of the privileges of membership. One of the most serious objections urged against foreign systems of architectural education is the absence of practical acquaintance with building operations. In England, where a society can boast in a single year of having conducted its members over so many fine buildings, such an objection must fall to the ground. But the classes which are peculiar to this society for the study of design and building construction tend still more strongly than the visits to assist the student in gaining an insight into those branches of his art which he could scarcely be made familiar with by any other means. The opportunities for exercising his inventive faculties are, we fear, too often denied to the pupil during the earlier years of his articles, or even if he has the chance, he needs the stimulus or incentive of competition and friendly criticism, which are essential, if not imperative, in leading him on to good results. We are aware that it has been alleged that more injury than good is done to the young architect by inducing him too soon to try his hand at designing—that is, before he has, from careful study of good models and due attention to precedent, acquired what we may term the architectural "knowledge of good and evil." But we must remember that this argument is too frequently brought forward only from the most selfish motives, and that the architect who declines to allow his pupil any chance of using his powers of thought and invention does not scruple to bind him down to the routine drudgery of tracing and copying, instead of preparing him by a proper course of study for advancement in his profession.

We must not, however, make use of this article only for enforcing our ideas upon architectural education. We started with the intention of pointing out some of the many ways in which the Architectural Association provides for the instruction of its members. We may select for this purpose the Class of Construction, which, as we have already stated, is on the mutual system. This class was started some years ago as a means of preparation for the Voluntary Examination, and while this object is still kept prominently in view, the matters discussed and treated of are such as to be necessary and valuable to all younger members of the profession. The Class of Construction, "formed," as we read, "in order to assist the members to obtain a knowledge of the practical part of their profession," meets on alternate Friday evenings throughout the session at half-past six o'clock. It is under the direction of the following officers, elected annually at the termination of each session—a president, two vice-presidents, and two honorary secretaries. These officers are charged with the direction of the meetings and the preparation of the questions, which usually relate to some one of the trades distinguished in a specification, as bricklayers, masons, carpenters, etc. The questions for the next time are given out at the close of each previous meeting, and in the intervening fortnight the members are expected to prepare their answers, which have to be illustrated, where necessary, with drawings. The answers are handed in to the chairman of the evening, and after he has read the first question he selects one of the written sheets before him and calls upon the writer to come forward and read it to the meeting, and, if requisite, to make a sketch upon the blackboard. This done the members of the class are requested to criticise the answer, to offer any suggestions, and to point out any further information they may have upon the subject. Much valuable information upon special details is thus often given to the class, and any member who may have had occasion to experiment upon, or make use of new materials or modes of working, can impart to his fellow students full particulars. The chairman may then sum up the general result of the discussion, and state what in his opinion has been the best mode of answering the question or dealing with the matter before them. The next question is then taken up and treated much in the same way by another member, called to the front to read out or illustrate his views. Sometimes the drawing on the blackboard may be objected to, and another mode of working out the question is drawn by someone else, and a warm debate may then ensue upon the better of the two plans. It is difficult to over-estimate the advantages of this mode of instruction. Men who have never had confidence to speak in public are induced by excitement and the desire of information to explain their views, and thus many obtain in this or in the allied class (for study of design) the power of speaking in public. Again, there can be no better plan, we are convinced, for discovering and exposing long-cherished traditional errors on practical matters, than such a means of instruction as this, and information on subjects which are too often considered to be peculiar secrets of allied professions is imparted to all present. We may, in order to make this account of the Class of Construction more complete, and, without, we trust, violating any of its secrets, give one or two of the questions on one particular evening, and explain the way in which they were answered. Thus in the questions for the meeting of Nov. 26th, 1869, which related to excavators and bricklayers. No. 1 runs as follows:—What is the prime cost value of 1 rod 120ft. superficial of reduced brickwork in mortar, built with bricks at 35s. per 1000, sand at 4s. per yard, lime at 12s. per yard; the labour and scaffolding costing 60s. per rod? A member having been called forward to read his reply, the first point raised was as to the number of bricks necessary for a rod of reduced brickwork. The number usually assumed is 4500, and for London stocks this is, in all probability, very near the mark, but

some of those present were for limiting the number to 4300, and even to 4250. The proportions of lime and sand not being stated in the question gave rise to some considerable discussion. Chalk lime will take 2 of sand, and this is the quantity more generally provided for in London specifications, but 2½, and even 3 parts is a proportion not unfrequently employed with stone limes, and some were for the use of equal quantities of lime and sand. Of mortar compounded in the proportion of 2 and 1, about two yards of sand and 1 of lime was assumed to be the requsite quantity per rod, and having calculated in this way the price of the materials, and included the 60s. for labour, the total price per rod was obtained. It then only remained to find the fractional value of the 120ft.—a simple rule of three sum, and this amount, added to the price per rod, was the answer required. The second question :—What will be the extra cost per foot super. for facing with bricks at 55s. per 1000, when the ordinary bricks cost 35s. per 1000, was then worked out by another member, assuming 7 bricks to be the number necessary per foot super.

3. How may flat roofs be constructed of plain tiles? This question elicited a considerable amount of information, and some practical hints on the methods of forming cheap roofs in this way.

4. How are dry areas usually formed? The commoner form of dry areas were well illustrated by the sketches of the members, and attention was called to the best means of draining and ventilating them.

5. Describe the various kinds of damp-courses in common use, and compare their cost. Not only those in common use, but a great many new patent and comparatively untried modes of securing walls and foundations against damp were explained by those present, the summing up being that there was most likely nothing so cheap and certain as a good layer of genuine asphalte.

The sixth question also called forth a good deal of discussion. Compare the different methods of bonding hollow walls. Metal cramps or ties which would appear the more effectual are liable to corrosion and gradual decay, and many of the recently-proposed plans of glazed headers and long bonding bricks cannot quite claim entire separation between the two thick masses of walls, which is, of course, the object aimed at. The three next questions required to be answered by drawings, and were as follows :—

7. What kinds of iron bonds are used in ordinary brickwork?

8. Give section to ½in. scale of a carriage-way 16ft. wide, formed with brick arches and iron girders—the girders 6ft. apart.

9. Describe, in terms suited for a specification, and give detail to ½in. scale, of a circular rain-water tank, 6ft. diameter, built under ground, to hold 1,500 gallons. This last question involves the difficult matter of forming a thoroughly waterproof construction. The majority of those present advocated the use of brickwork in cement, protected by puddle. It will not be necessary for us to quote the remaining questions, as we have, we believe, said enough to explain the system on which the class is conducted. It may be confidently said that no one is too old or too well-informed to profit by what goes on in the class of construction, and we can only wish it, in conclusion, a long and successful career.

ARCHITECTURE IN MANCHESTER.

(*Concluded from Page* 42.)

LAST week's article included descriptions of certain municipal works of comparatively recent erection; but there are others of which some notice should be taken.

Public statues in the open air were, a quarter of a century ago, unknown in "Cottonopolis." She may now, however, be justly proud of, not only the number, but the quality of her statues. The bronze one of Cobden, in S. Anne's-square, is the most recent of these works, and is perhaps the least statuesque and the worst placed—that is to say, in the very centre of the square, with nearly everywhere a too proximate background of shops. The statue itself, though perhaps not the thoroughfare, would have been all the better for a more immediate contrast with the quiet dingy church at its rear. In Peel-park, Salford, is a white marble statue of the same statesman, on a pedestal of white granite, that struck us as being remarkably good. The figure is both graceful and expressive, and the pedestal is far more satisfactory than pedestals usually are. We can conceive no better materials for sculpture than white marble for the figure, and white granite for the pedestal, as used for this Cobden statue and the neighbouring ones of Her Majesty and the Prince Consort in Peel Park, Salford. The remaining bronze statues here and in Manchester (of Wellington, Peel, Watt, Dalton and Brotherton) are all good in their way, but in a murky atmosphere, such as they are destined to appear in, do not look to such advantage in bronze as in marble. The triple contrast of light, shade and shadow, so all enchanting in architecture, is lost in these works of the sculptor, which, on nine days out of ten, present little more than a harsh outline.

Manchester is rich in Free Libraries, placed all over the city and its suburbs. The central one in Camp Field may not improbably be removed to the old Town Hall (with, we trust, its surmounting sculpture replaced) when the new one is completed. The Ancoats Free Library is a rather remarkable building, designed by Mr. Waterhouse. It is a structure of common brick, with little of stone, and still less of red bands; simply a hipped parallelogram with two transepts connected with a lean-to; its style Free Gothic, and treatment very masterly. *Apropos* of this hipped edifice let us add that in Manchester *hips* are now everywhere formed of the slated plane of the roofs, and all lead rolls or tiles to such features are disused, greatly to the improved effect of the edifices, as any one would imagine.

The Corporation have erected a large and ornate Gas Station in Medlock-street; the ground floor of the street façades massive and good, but the buildings spoiled with a feeble cornice and balustrade, placed, *without interval*, immediately *upon* the archivolts of the upper windows.

The churches and chapels in and about the City are too numerous to wholly describe. One of the largest, if not the largest, is that of St. Cross, at Clayton, a red brick structure by Mr. Butterfield. It is designed in the Decorated style of Pointed architecture, and consists of an unusually long and lofty clerestoried nave and chancel, with lofty aisles and transeptal chapel; a boldly-projecting south porch, with tower at west end of the south aisle, and a narthex with central doorway at west end of the nave. The extreme length of this edifice is, for a modern church, unusual; and this, we think, is its chief and solitary virtue. Looking at the exterior of the structure, its outline is essentially modern. The details, with great costliness, are meagre to a degree, and the general proportions perverse and unsatisfactory. The tower of this lofty church (some ten bays in length) is a diminutive campanile, rising with many stripes and angle buttresses up to the nave ridge, where occurs the bell-chamber with, on each face, a triplet of meagre louvred windows set in a high recess or panel, corbelled high above their heads; and over all, after more corbelling, occur the eaves of a diminutive pyramid of striped slate, crowned with a metal vane; the whole steeple out of all proportion with the church. The windows of the clerestory are long narrow couplets with foliated heads, extremely mean in appearance, their interfenestration somehow diminished as they approach the chancel. The entire outside walls are striped about every half-dozen courses with wide bands of glazed black brick, save over the windows, where large diapers occur. The details of the narthex wall are effective; but in the gable above it are three two-light windows, whose *acute* heads are surmounted at a considerable interval of plain masonry with *obtuse* arched labels—a freak that has the effect of disagreeably enhancing the weakness of the angles. The edifice stands well back from the road, is seen from a considerable distance around, and for its length, its height and its costliness, is a fine opportunity thrown away. Surely a large church like this should have had large treatment; and a more massive steeple than this poor, un-English-like *campanile*.

The Stowell Memorial Church is another large edifice of very recent erection. Here the material used is stone, and the proportions and grouping are very good. The style is Early Decorated. The building has a wide clerestoried nave, a narthex with flying buttresses, and North and South transepts flush with the nave aisles. The internal arrangement of the transepts, divided by an arcade from the nave, is ingenious, cleverly relieving it from the effect of its extreme width, and what, but for the device, would be its rather sprawling arcade. The chancel, of nearly equal height to the nave, looks all the better for being divested of aisles. At its junction with the North transept rises the tower, very simple and lofty, crowned with a plain octangular spire. The church is, take it altogether, a bold, picturesque work, whose general merits are too good to let us dwell on some unfortunate eccentricities of detail about its window labels, spire lights, &c.

In Newton-street, Ancoats, a cheap church is in course of construction, with a tower and timber-framed spire of not very pleasing proportions; the details, worked out in red and black bricks, very coarse and faulty.

Of the churches lately built by Dissenters, the largest and most noteworthy are two built by Mr. Waterhouse at Ancoats and at Rusholme, one by Messrs. Paull and Robinson, and a fourth, very recently completed, from the designs of Messrs. J. M. and H. Taylor. Of these the three first named have been built for the Independents, and the one last named for the Free Union Baptists. Mr. Waterhouse's two churches are both of them well-designed structures of red brick with black bands, having well-proportioned slated spires. In the one at Ancoats the octangular spire is set anglewise on a square tower with slated broaches at its angles. This church, very peculiar in its plan, is well known from illustrations. Since its erection, it has been partly encroached upon, and has now been purchased by the Midland Railway Company.

Messrs. Paull and Robinson's church stands on an excellent site at the junction of Every-street with the Bradford-road, and is an imposing and somewhat remarkable building. It has a nave, with transept and aisles, at present partitioned off from the nave, and used as class rooms, much to the improvement of the interior. Externally the architectural style may be termed Free Gothic of Continental aspect. The main doorway, in a saddleback tower at the corner of the two streets, has a masive stone *tympanum* now charged with six large stone figures of children in *alto relievo*. They are well carved, but have no particular meaning. *On dit* that two of these figures have lately displaced a much larger central figure of Our Lord blessing little children, for some special reason not quite obvious to a stranger. However, the six well carved children (albeit *apropos* of nothing to speak of) are very ornamental; and the doorway is the best feature about the church. Let the critic "rest, and be thankful."

The last of these four structures (the Union Baptist Church at Rusholme) is a very large and stately building, just completed under the direction of Messrs. J. Medland and Henry Taylor. The exterior is of red brick, very ornamentally treated, with a fair admixture of stone, stone carving, and polished granite—the

style, if anything, French Romanesque. The principal entrance is through an open arcade, elevated on a bold flight of steps; and over it is a richly adorned wheel window lighting the *quasi*, "nave" of the edifice. A turret on each of its sides serves to screen off, as usual, the sloping eaves of the building—the one on the right hand side rising high above the ridge, and terminating in a square slated spire and vane. The interior, a mere galleried *auditorium*, quite dispels the ideas of High ecclesiastical character conveyed by the outside façade; but here the architects have displayed no little talent in meeting the necessities of their task. Everything, from the gentle rise of the ground floor away from the pulpit down to the metal rain cups for the wet umbrellas of each pew, seems to have been thought of. For a building with a good church-like exterior we should say, this is internally one of the handsomest and most comfortable of Dissenting places of worship.

There are several warehouses and commercial buildings about the City deserving of commendation, and in most of them examples of good doorways are often to be seen. The stone doorway of the Norwegian Consulate in Oxford-street, and one of mere brickwork in Brown-street, may be mentioned as examples.

Mr. Truefitt's bank, built for Mr. Cunliffe Brooks, is now completed. It is an exceedingly elaborate and cleverly designed stone building, with a profusion of carving and parcel-gilt wrought iron work in balconies and finials—perhaps a little over-done, but all manifesting careful study and refinement. The arches of the *port cochere* might, we think, be somewhat more massive with advantage to the general composition; but it is altogether an admirable exterior.

Some very large warehouses have within the last few years been erected in Aytoun and the adjoining streets, and though they call for no special comment, they well sustain the architectural repute of the city for buildings of the class. In Portland-street are two very large ones; one of brick, by Mr. Salomon, with a handsome vestibule and elaborate stone doorway of questionable merit. The other is a stone warehouse in the Gothic style, by Mr. Waterhouse. The main façade of this long and lofty *Gothic* structure (seven stories high) is strictly symmetrical, having a raised projecting centre, whose *hipped* roof (with one solitary dormer in its midst) is unfortunately overborne by the bolder gables of the side *pavilions*. Nor is there, lower down in the façade, any architectural feature whose more pronounced form, depth, or projection compensates for this lack of central *emphasis*. Mr. Walter's buildings of this class strike us as at present the most successful works in the city. They are well known.

In several warehouses and street façades there is a manifest tendency to engraft the Gothic on the astylar Italian style; and this, too, with a "zeal without discretion." Thus, one may see occasionally a lower storey of stone, with nooked and banded shafts, rejoicing in quaintly carved capitals of mediæval freedom; and the building, after a little Romanesque flirtation higher up, terminating in a Palladian cornice with dentils or mutules of quite "Pagan" aspect. If these solecisms were the works of the mere "speculating builder" one would omit all reference to them; but in Manchester this is not the case; they are the works of architects, who sin advisedly. W. Y.

ILLUSTRATIONS OF WINDOW TRACERY.*

(*Continued from page* 417, *Vol. XVII.*)

FLOWING TRACERY.

THE Geometrical tracery of which we have hitherto treated is distinguished from succeeding styles by the very definite and independent character of its forms. The leading idea pervading all its varieties is that of occupying the space in the head with a combination of distinct patterns, which, as a general rule, have little or no connection either with the mullions or with each other. They support and are supported one by the other, and touch at many points, but they do not seem to grow out of each other, and they often leave void spaces which very plainly indicate the distinctness of the parts between which they lie. The headpiece of a true Geometrical window might often be taken to form an independent triangular composition, and in like manner many of the subordinate figures might be set up as separate windows on their own account. The pure Geometrical style, however, became at last fused into the magnificent and varied forms of Flowing tracery, of which we have next to speak.

Flowing tracery is so called to distinguish it from the Geometrical which preceded and the Perpendicular which succeeded it, because the lines are evident continuations of the mullions, taking a very free and unrestrained course, branching out in different directions in all parts of the window, and forming patterns which flow into each other in every variety of graceful intricacy, each figure being the natural complement or result of its neighbours. The leading idea of the true Flowing style is that of continuity of the mullions, but it is distinguished from the Flamboyant and Perpendicular styles, in which the same idea predominates, by the want of tendency of the lines to any particular point. In the Flamboyant styles the lines always assume a flame-like curve, necessarily tending upwards, and thus form figures of an elongated and narrow shape; while in the Perpendicular style the lines are simply elongations of the mullions in a perpendicular direction, with figures formed in the intermediary spaces simply by foliation. In the Flowing style, however, the lines ramify in almost any direction, and form figures which may have either an upward, downward, or horizontal tendency; which may assume a wheel-like form; and which may approach the pervading circular character of the Geometrical, or halt at any stage between that and the elongated flames of the Flamboyant.

Flowing windows present several very clearly-defined subdivisions. The first of these is known as

RETICULATED TRACERY.

This name is derived from the resemblance of this class of windows to meshes of net work. It is an evident result of an attempt to engraft the principles and forms of the Flowing style upon the severer style of the preceding Geometrical. The principal characteristic of the variety consists of a vesica with one or both extremities converted into an ogee arch, and which may be called an *ogee vesica*. This figure may be considered to occupy in the Flowing style the same position which is occupied by the circle in the Geometrical style. It may be considerably elongated or shortened, as it is considered to be struck from one or from two centres. In the former case it presents a somewhat squat form, if considered alone, but when used in very large windows it has a peculiarly grand and imposing effect. In combination this figure appears to be simply the result of an attempt to fuse together several circles placed in the manner in which they usually are in the head of an Early Geometrical window. Of this we give an illustration in fig. 45. A practical example of this kind of tracery is also shown in our representation of the west window of the Friary at Reading (see fig. 46). That building was commenced about the year 1285, and this window consists of five trefoiled lights, with the ogee vesicæ in the head quatrefoiled. The more elongated figure struck from two centres is not quite so common in the large windows of this style, but it may, nevertheless, be occasionally seen. In either case the true Reticulated idea is that of a large expanse of the same kind of figures cut through at an arbitrary point—*i.e.*, by the arc of the window itself. Near the boundary line we find a number of imperfect figures, which it would be impossible to avoid without giving up the main idea of the style altogether. Instances, however, are not wanting in which this was done, of which we may specify a four-light window in Jersey, a three-light window at Southwell Minster, and several others, all figured by Mr. Freeman in his valuable work upon "Window Tracery," at page 96. In other instances the effect of a Reticulated window is produced without its lines by simply using quatrefoils ingeniously shaped and fused together. An example of this in a three-light window at Heckington is likewise given by Mr. Freeman on the same page.

OGEE TRACERY.

The next variety of the Flowing style is known by the name of Ogee tracery. It answers in some degree to the Arch tracery of the previous style. As that is formed of the simple arch, so is this formed of an arch more in harmony with the general character of the style—the ogee. Hence its name. It also presents diversities very nearly analogous to the two main subdivisions of its predecessor—namely, whether the arched lines intersect or not. An example of Ogee tracery, with non-intersecting arches, is given in our illustration No. 47, which represents a clerestory window at Oundle of three lights. This window is little else than the three-light window previously described under the head of Arch tracery, varied by the circumstance of the arches being ogeed. Other examples are frequently to be found in windows with flat heads, and this form of tracery is a favourite one for clerestory windows.

Our next illustration, No, 48, represents a three-light window at S. George's, Stamford, in which the lines intersect one another. Here all the three lights are grouped under a single ogee arch, springing from the outer sides of the lights, the apex of which coincides with that of the window. This arch is in its turn intersected by two other imperfect arches of the same form, which spring from the centre light. This arrangement produces two small spaces, side by side above the centre arch, with an elongated space above them, and four irregular spaces at the sides All of these spaces are foiled, but, owing to the general predominance of concave lines, the effect is anything but pleasing. The quatrefoiled figures of this window are very characteristic of the style.

FLOWING WHEEL TRACERY—DIVERGENT, CONVERGENT, AND REVERSED.

The later forms of Flowing tracery were, however, much more graceful and complicated than any we have yet described. The difficulty of classification is very great, so immense is the variety, and so many combinations are admitted into the patterns. An attempt, however, has been made by conceiving the leading idea of the wheel window, so well known in the Geometrical styles, in which a central point is assumed, around which the figures formed by the ramifications of the lines may arrange themselves. In the Geometrical wheel windows there are two leading varieties. The first is that of a wheel with its spokes, and the latter is that of a number of vesicæ united at a point. When the idea is that of the spokes of a wheel, it follows that the lines must radiate from the centre, but when the idea is that of a number of vesicæ it may be said of them that they either diverge or converge in relation to the centre. This relation of the figures to an assumed centre gives rise to the several varieties of divergent, convergent, and reversed tracery, and when the several varieties are combined, some very complicated and beautiful forms are produced.

* This article should have preceded the one which appeared in our issue of January 7th last, and applies to the lithographic illustration given on that date. The letter-press which appeared on January 7th refers to the illustration published this week.

An example of pure Divergent tracery is given in fig. 49. Here the heads of the figures are placed towards each other. This form is very extensively used for windows of two lights, but can hardly be applied to windows of larger size without introducing a combination with other forms.

Fig. 50 is an illustration of Convergent tracery, which is a form the direct opposite of that just described. In this, instead of a central line from which the figures appear to be thrown off, they converge more or less from the sides to a central point. The effect is a very inharmonious one. The figures do not gracefully melt into each other, as in most of the other varieties, but are thrown together with as little or less connection than in some of the Geometrical patterns, while they are destitute of the severe simplicity and purity of form which characterise that style. The principle of convergency, however, seldom extends beyond the two large horizontal figures above the lights. The head of the window is mostly occupied by the same kind of ogee vesica which marks also the Reticulated and Divergent varieties of the Flowing style.

Figure 51 is an illustration of the Reversed, Convergent, or Revergent variety. In this the two convergent piercings, instead of springing from the sides of the window, or in any way originating from or being supported by the lights, start, as it were, from above, and come down to meet them. The ogee vesica usually occupies the head, as in the other varieties, but the general effect is far from being a very pleasing one.

A much more beautiful effect is produced by the combination of these three varieties in one composition. We give an instance of this combination in fig. 52, which represents the east chancel window of Lindfield Church, Sussex, where Divergent, Convergent, and Reversed figures may be seen together, fitting into and complementing each other in a fairly satisfactory manner.

COMBINATIONS IN FLOWING TRACERY.

A full study of the many interesting combinations which may be made of Flowing and Geometrical figures would carry us far beyond our limits. The student will find them fully treated in the pages of Freeman, Sharpe, and Brandon. We can only say here that it is in the combination of the various styles that the finest traceried windows can be produced. This combination, however, often leads to great difficulty in the endeavour to assign a window to its proper classification. The Geometrical and the Flowing are so often mingled in the same composition that it is almost impossible to say which of them predominates, and this difficulty is farther increased in some windows by the introduction of lines having a decidedly Flamboyant and Perpendicular tendency. The five-light window at Hawkhurst, in Kent, shown in fig. 53, is, for example, a very rich and singular composition. The lines are evidently of a Flowing character, but the circle, which the large central light seems to have broken through, and which is the chief characteristic of the Geometrical style, was evidently the leading idea in the minds of the designing architect. In the fenestellæ we also observe a juxtaposition of both Perpendicular and Flowing lines in the same space, and the wheel is so managed as to give a vertical line, produced from the central light. The figures in the spandrels seem to have been borrowed from those over Perpendicular doorways.

Other combinations are to be found of Geometrical outlines which are occupied by Flowing patterns, a fine example of which may be seen in the large five-light window at Plympton S. Mary's, where some Early lancets, and a fine circle forming a wheel, are filled with a mixture of Convergent and Reticulated tracery. Again, we find the outlines of Arch tracery occupied with Flowing patterns; and, on the other hand, Flowing outlines may be filled up in their turn with Geometrical patterns; and yet, again, every variety of flowing may be commingled with every variety of Geometrical. The effect of these combinations is always curious, but it must be acknowledged not always pleasing. A window must not be a mere collection of forms without order, and without due subordination of parts. The attempt to produce variety does not always result in the production of beauty, and before the designer attempts to originate any new combination, he should take care that he has well acquainted himself with the leading principles and peculiarities of each style, that he may know how to subordinate them into an harmonious and beautiful whole.

(*To be continued.*)

ARCHITECTURAL PUBLICATION SOCIETY. — THE "DICTIONARY OF ARCHITECTURE."

A SPECIAL general meeting of the subscribers was held at No. 9, Conduit-street, Regent-street, on Wednesday afternoon, the 19th inst., Thomas Henry Wyatt, Esq., in the chair.

Mr. ARTHUR CATES, the Honorary Secretary, read a report from the Committee, congratulating the members on the complete discharge of all debts and liabilities, and the possession of a cash balance of £150 available for the prosecution of the "Dictionary." The result of the exertions made to obtain new subscribers, so as to secure the completion of the "Dictionary," was reported as having been attended with remarkable success, only 67 names being now required to fill up the list, and, as new adhesions were still coming in, the Committee recommended the subscribers to authorise the immediate undertaking of the work of completion, relying on the continued exertions of the members to secure the additional subscribers still required.

The CHAIRMAN referred to the great share of labour and responsibility in the production of the "Dictionary" that had fallen upon two or three gentlemen, and remarked that as about 100 new subscribers had been obtained since last May, it would be surprising if, in the course of the next twelve months, they did not obtain the additional 67 names required to fill up the list.

After some discussion, a series of resolutions with reference to the issue of the work were unanimously adopted, and ordered to be printed and sent to every subscriber.

Mr. CATES having made some suggestions as to the means of obtaining farther subscribers, the Chairman referred to the great efforts that had been made since the last meeting to secure fresh subscribers, and several members expressed their hopes that the subscription list would be filled up, and the publication of the "Dictionary" continued without delay.

Mr. NEWTON proposed a vote of thanks to the Honorary Secretary of the Society (Mr. Cates), and to the Honorary Secretary of the "Dictionary" (Mr. Wyatt Papworth), for their kindness in their past labours, and those which they had promised for the future. Mr. EDWIN NASH seconded the proposition, and hinted that a tangible acknowledgment of the labours of those gentlemen should be made at some future time. The proposition was supported by Mr. THOMSON and by Mr. SYDNEY SMIRKE, and carried by acclamation.

Mr. WYATT PAPWORTH, in acknowledging the vote of thanks, said the work must have stopped but for the energy of Mr. Cates in collecting funds, and expressed his willingness to continue the work.

Mr. ARTHUR CATES said that the great honour of the work was due to Mr. Papworth; without him there would have been no "Dictionary." It might truly be called "The Dictionary of Architecture, by Watt Papworth," for it was his work and his exclusively.

Some discussion then took place between Mr. T. C. CLARKE and Mr. CATES, the former gentleman expressing a hope that the "Dictionary" would forthwith appear regularly and without the delays which had hitherto occurred, and giving it as his opinion that it was too much to expect a professional man like Mr. Wyatt Papworth to be burdened with such a task, and that a paid editor ought to be appointed. Mr. CATES, in reply, detailed the reasons for past delays, and said that the difficulties in the way of appointing a paid editor were so great that the idea (which had been under the consideration of the Committee) had been abandoned.

The proceedings terminated with a vote of thanks to Mr. Wyatt for presiding over the meeting.

SOUTH METROPOLITAN WATER SUPPLY.

GREAT complaints have been made within the past year as to the turbid and unwholesome condition of the water supplied to the greater portion of South London. The Registrar-General and the various local medical officers of health have drawn attention to the matter repeatedly, but the evil has not been remedied. Mr. J. N. Radcliffe, by direction of the Medical Department of the Privy Council, has recently been investigating with respect to the water supplied by the Southwark and Vauxhall, the Lambeth, and the Chelsea water companies. Mr. Radcliffe reports that in twenty-eight monthly examinations of water, from February, 1867, to May, 1869, the water of the Lambeth Company was found to be turbid eleven times, that of the Chelsea Company ten times. The intakes of these two companies (which are nearly side by side) are influenced by the freshets and floods of the Mole, which bring down with them large quantities of fine *detritus*. These intakes are about a mile *below* the influx of the Mole into the Thames; and Mr. Radcliffe says that "below the entrance of the Mole, the Thames may be turbid, while above the entrance the water is clear and bright. The 'set' of the river at Long Ditton and Seething Wells is to the side of the river upon which the works of the two companies lie. This is so markedly the case, that the half of the stream near the works may be very turbid, while the opposite half may be comparatively clear."

Mr. Radcliffe's summary of his elaborate and valuable report gives the causes and suggests the remedies for this unsatisfactory state of things. With reference to the Lambeth and Chelsea companies, he states that the systems of filtering in use, "while sufficient when the river is at its best, are largely insufficient when the river is at its worst." He also states that the source of supply is objectionable, and suggests that the intake of the companies should be removed above Moulsey lock, and that additional provisions should be made for subsidence and filtration. The Southwark and Vauxhall Company, he says, should be required to do away with certain means which it has for taking into its reservoirs water from the Thames at Battersea, as the turbidity he believes to have been caused in part either by the admission of tidal water into the reservoirs, or the admission of unfiltered water from the subsidence reservoirs into the pumping wells, and so into the mains.

DISCOVERY AT SAKKARA.—Some interesting archæological discoveries have just been made at Sakkara, in the immediate neigbourhood of the famous Serapium or Bullpits in Egypt. In removing some sand heaps the workmen came upon an antique statue, which led to further investigation, and an avenue of about a dozen similar relics were discovered. These works of art, which consist of two figures seated respectively on lions, and four others on horseback, the remainder on foot, are presumed to be those to which Strabo alludes.

RAILWAY BILLS.—Among the 87 railway bills which seek Parliamentary sanction in the coming session, 27 of the applications are for powers for the construction of actual fresh lines by newly incorporated companies. These include the East and West Metropolitan Junction and Mansion-house Railway, consisting of a line from the Great Eastern, North-Eastern, and East London Railways to the Metropolitan and District Railways, with a central station near the Mansion-house; a new railway from Colebrooke-row, Islington, to Moor-lane, London; the East and West Junction Railway; a new railway from Redhill to Godstone, in Surrey, in connexion with the South-Eastern line; Hounslow and North London, to connect with metropolitan lines; a new line from Hammersmith and City to Fulham; Charing-cross railway bridge to Wellington-street, Waterloo-bridge; new line from London and South-Western to Cobham; the Severn Tunnel Railway under the river Severn, in addition to 19 newly projected lines in other parts of the country.

Civil Engineering.

THE FAILURE OF THE BRADFIELD RESERVOIR.

THE 11ih day of March, 1864, will always be a memorable day at Sheffield. At midnight on that day 250 people—men, women, and children—were swept away from their beds to their death in the space of half an hour.

There is a steep and narrow valley running up from Sheffield westward, at a rise of 70ft. in a mile, for seven miles, down which flows the river Loxley, fed by the smaller stream called the Dale Dyke. Going upwards from Sheffield there is Neepsand, the nether and the upper slack works, the Birley meadow, Owlerton, Loxley Bottom, Scythe Wheel, Broomhead Wheel,* Green Wheel, Carr Wheel, Cliff Wheel, Olive Paper-mill, Rowell Wheel, Loxley Old Wheel, Storr's Bridge Forge, Stacey Bridge, Damflask Paper-mill, and Damflask Corn-mill. Here the stream takes the name of the Dale Dyke. A mile further up stream is the village of Low Bradfield. In this valley dwelt the people who were employed at these works. A mile above Low Bradfield the Sheffield Water Works Company had been, at the date set down at the head of these remarks, making a large reservoir—a reservoir that held 114,000,000 cubic feet of water. Its embankment had been raised to its full height of 95ft. The weather during the previous fortnight had been exceedingly wet. A flood channel had, in the first instance, been cut to carry off the water and allow the bank to be raised without its interference. When the bank, however, had been raised to nearly its full height, and the engineers and contractors began to feel themselves secure from harm in this respect, the flood channel was reckoned of no account, and was allowed to decay, indeed, was destroyed, first partially by a great flood, and then by pulling down its side to get materials for the great bank. So that for several months before the date we have mentioned the flood channel was useless.

This part of the country is subject to heavy rains. In the month of August, 1856, 8¾in. depth of rain fell there. In June, 1863, two days' flood put 50ft. depth of water into the reservoir. The average rainfall is upwards of 40in. per annum. So that it may be taken that this is a generally wet district. At half-past eleven o'clock at night on the 11th of March the embankment of this Bradfield Reservoir gave way, and a hundred million cubic feet of water were shot down the valley within the space of forty minutes. The volume of water that ran down the valley for the space of forty minutes was 40,000 cubic feet per second, and its speed that of a race-horse—26ft. per second. Such a body of water in such violent motion one can hardly imagine, and if any one saw it his senses must have been bewildered. Thirty-nine dwelling houses were swept away, twelve manufactories, four mills, fifteen workshops, fifty-three other buildings, and fifteen bridges; all these were wholly destroyed and 250 people drowned or otherwise killed. Besides these, 376 dwelling houses, 25 manufactories, 17 mills, 13 workshops, 11 other buildings, and 5 bridges were partially destroyed. When the water got out of the narrow valley at Owlerton it began to spread out, and by the time it reached Sheffield town its destructive force was lessened, and the damage it did was the flooding of the streets to many feet in depth, and 4357 houses, of which 798 were rendered uninhabitable.

These were the immediate effects of the failure of the embankment of the Bradfield Reservoir. The cause of its failure has, perhaps, not yet been stated. There is plenty of evidence; let us see to what effect. First, the engineer of the work, Mr. J. Towlerton Leather, said that a landslip occurred at the site of the embankment on the northern side of the valley, which carried the bank with it, or moved it to such an extent as to break the puddle wall and let the water escape. Messrs. Simpson, Hawksley, Bateman, Fowler, and T. E. Harrison agreed with Mr. Leather, and one would have thought that what these gentlemen all agreed upon could be but true. There had been at some time undoubtedly a landslip near the bank, lower down, at the spot where Mr. Leather had first intended to make the embankment, and seeing this he made the embankment higher up the valley at a place where the ground seemed sound and not likely to slip. So that it might well have been stated that a landslip had been the first movement. Other engineers gave other opinions of a nature more complicated than this one, but before we can describe them, a description of the bank itself is necessary.

The site of this reservoir is on the outcrop of the coal measures. The strata consist of close and retentive shale, alternating with thin beds of sandstone, and including a stratum of rock known by the name of "gannister," usually found with and forming the floor of one of the lowest seams of coal in the local series. At the site of the reservoir this coal seam was extremely thin, and in places hardly perceptible. Shale and stone, therefore, were the materials of which the bank was composed, the clay being selected for the puddle. Moreover, the stone was selected and deposited at the foot of the outer slope of the bank to prevent it slipping—with the avowed object, that is to say, of preventing the bank slipping; and an extra 3d. per cubic yard was paid to the contractors for the selection and deposition of this stone, of which there were 24,000 cubic yards, forming quite a bank of itself, 50ft. high to its apex. Thus the bulk of the embankment, and the whole of the inner slope, were composed of shale alone. It is necessary to a right understanding of this record that the nature of this shale should be understood. To those who are acquainted with the coal measures and millstone grit formation its nature is well known. To others it may be said that when pulled to pieces in the process of excavation it is shivery, friable; slippery when in contact with water.

In short, it has every appearance of having once been a deposit of mud which has become compressed into a solid state by the weight of the superincumbent rocks, but which is ready to go back to its original state of mud on a sufficient quantity of water being restored to it; to become dissolved, in fact.

The length of the embankment was 1584ft. and its top width 12ft. The top of the bank when finished and fully settled was to have been 5ft. above the top water level, or the level of the waste weir. The slopes were 2½ horizontal to 1 vertical, both on the inside and on the outside. The height of the bank where it crossed the stream of water called the Dale Dyke was 95ft. A puddle trench was excavated down to retentive ground, which was not reached, near the middle of the bank, until the trench had been sunk to a depth of 60ft. In other parts the depth was not so great, but in all parts of its length the trench was carried down to retentive ground. Crossing the line of puddle trench was a fault in the stratification. Before the excavation was begun, a strong spring of water issued from this fault above the site of the embankment, and on sinking the puddle trench, the water left its normal place of issue and followed the excavation of the trench and was pumped out by steam power. The quantity of water was great, requiring four large pumps to be kept working. After the trench had been filled with clay puddle this water was thrown back, and issued again at its old place within the site of the reservoir.

The clay puddle was carried up in the centre of the bank in the form of a wall 16ft. thick at the bottom in the middle of the bank, and finished 4ft. thick at the top, the widths at the bottom in other parts of its length being as much greater than 4ft. as allowed a batter on each side of ¾in. to the foot. The puddle was well made. Its thickness was less than puddle walls are usually made, but the quality of the workmanship was good. The bank itself was formed chiefly by excavating within the site of the reservoir, and running the stuff into the bank by waggons and rails, with tips of from 3ft. to 5ft. in height. Probably the latter height mostly.

The method of drawing off the water from the reservoir was by cast-iron pipes laid in a trench in the solid ground under the seat of the embankment, and surrounding them with clay puddle of a minimum thickness of 18in. There were two lines of discharge pipes, 18in. diameter, laid 2ft. 6in. apart, the joints of either line of pipe being placed, not opposite those of the other line, but opposite the bodies of the pipes, the sockets facing the reservoir; so that the rim of the socket, which was 2½in. thick, formed, with the thickness of the joint (⅜in.), a projection of nearly 3in. all round each line of pipe every 9ft. of its length. The pipes were of more than the ordinary strength of street pipes, being 1¼in. thick in the body. The length of the socket was 6in., and its diameter at the inner end was ¼in. greater than at its outer end; so that the joint, which consisted of lead and yarn, was in the form of a wedge, opposing its thicker end to the pressure of the water from within the pipe, tending to prevent its being blown out. The depth of the trench in which these two lines of pipe were laid was 9ft., but at the point where it crossed the puddle trench the puddle trench was 30ft. deep, and to avoid a sudden drop in the depth of the puddle under the pipe from 18in. to 30ft., the pipe trench was run up from the bottom of the puddle trench at a slope of about 5 to 1, coming up to the 9ft. depth at a distance of 100ft. on each side of the puddle trench. The inner ends of the discharge pipes, which were enclosed in a forebay of masonry, were open. The valves were placed on the outer ends of the pipes, in duplicate on each line, within four pipes' length of the very ends, the four valves being enclosed in a valve house of masonry. Of the two valves on each line of pipe, one was kept open, and was to be used only when the other should be under repair. The pressure on the door of each of the valves in use was about 4½ tons when the reservoir was full. These discharge pipes would together let off about 5000 cubic feet of water per minute. For waste weir, the means of carrying off the water that might come into the reservoir when it was full which these two discharge pipes could not let off, there was a length of 64ft. provided, the drainage area being 4300 acres. We have mentioned this weir only for the sake of completing the description of the embankment; it never came into use, and so formed no part of the cause of failure, although at the moment of the catastrophe the height of the water was within a few inches of it. It may, however, be incidentally mentioned that it was much too short to carry off a heavy flood from 4300 acres. The reservoir when full covered an area of 78 acres, and held 114,000,000 cubic feet of water.

These being the facts of the case on the 11th of March, 1864, let us see what had previously occurred.

The bank was finished in April, 1863. In June of the same year there was a flood which put into the reservoir a depth of 50ft. in two days. At this time the top of the bank was 7ft. 4in. above the top water level, or the level of the waste weir, being 2ft. 4in. above the intended permanent level of the top of the bank. This allowance had, of course, been made for subsidence of the earthwork.

There is no record of the exact height of the bank above the waste weir on the day above-named, but about a week after the

*A "wheel" at Sheffield and the neighbourhood is a mill where saws, edge tools, and knives are ground, and where the machinery is usually driven by a water wheel.

accident, the present writer saw the parts of the bank remaining, and estimated the height roughly at 6ft. above the waste weir. It had not yet settled down to its appointed level of 5ft. above that level, although it had gone down since June of the previous year a foot or 16in.

To return to its previous history, it is on record that the fortnight preceding the day of the failure had been a wet time, and that was one of the grounds for the opinion of those eminent engineers who said the sole cause of the disaster was a landslip. The possibility of a landslip was feasible enough. The strata dip from north to south at an angle of one in six. There had actually been a landslip not far below the site of the bank. There was a cottage house on the north side of the valley, opposite the embankment, which showed that some movement of its foundations had taken place. It was not, however, very well determined when this took place. A landslip, indeed, was a possibly true theory of the case, but it seems to us that there is a more certain, intelligible, immediate cause of the accident.

We are now, after the lapse of nearly six years, trying to unravel a mystery. It has always been a mystery how this bank failed. At the time, strong personalities were used, especially by the coroner at the inquest; but now, although the people of Sheffield will never cease to remember the day on which the Bradfield reservoir burst, we can more calmly review the scene.

Let us first dispose of the opinions given there and then soon after the accident. Mr. Rawlinson and Mr. Beardmore made a joint report to the Government, in which they (we hope to be pardoned if we attribute the chief influence of this report to Mr. Rawlinson)—in which they stated that the disaster was attributable to the escape of water either through the joints of the discharge-pipes into the outer part of the bank, or along the outside of the pipes between them and the surrounding puddle, or both, for they laid great stress on the probability of both defects having happened. To understand how the first-named of these supposed defects could have happened, we must take into consideration that the pipes were socket pipes laid on clay puddle, which might yield to their weight and to that of the superincumbent earthwork, causing them to sink and the joints to be drawn. We must suppose they meant only partially drawn, for it is inconceivable that any one joint should have been drawn to the extent of 6in., which was the length of the socket. Then that the pressure of the water in the pipes blew out one or more of the lead joints and allowed the escape of water into the bank. A great deal was made of the pressure of four or five tons on each of the valve doors at the outer ends of the pipes by some of the witnesses. This, it was supposed, might have drawn the joints apart.

It is sufficient to condemn this view to consider that if any such thing had happened, the joint first drawn, and probably the only one, would have been that of the pipe adjoining the valve, for the pipes were not bolted together, so that one could draw another with it, much less could the movement of the pipe next the valve have had any tractive action on the pipes in the body of the embankment. And if any such drawing had taken place, the escape of water would have been in or close to the valve house, and could not have been unobserved. That a joint may have been blown out in some part of the bank is more possible, but still highly improbable. Pipes laid less guardedly than these were, are constantly subject to a much greater pressure than these were, and a blown joint is a rare thing, even in scores of miles of piping, while here we have to do with only the fifth part of a mile of pipe laid with unusual precautions.

(To be continued.)

LORD NAPIER ON HINDOO ARCHITECTURE.

THE following are passages from Lord Napier's lecture on Hindoo architecture to the Native Christian Literary Society of Madras:—

The Brahminical architecture is imposing, it is even poetical with its accessories; yet, regarded both from a scientific and an æsthetic point of view, it is manifestly defective. In the Brahminical style the ruling feature is the horizontal line; the wall or the column supports a beam, the beam supports a flat roof. When the building is lofty, the fabric ascends by successive horizontal stages, one succeeding another in diminishing proportions to the apex. The inherent poverty of this method of construction is often ingeniously concealed by decoration on the contours, and the fabric rises with a certain measure of continuity and elegance; yet the fundamental features can still be discerned. The characteristics of the style, as practised in the temples of Southern India, are a multitude of supports crowded together, small intervening spaces, square apertures, horizontal superposition, a vast expenditure of solid material, and radical defects of form, disguised by minute ornamentation. It is abundantly clear from our every-day observation that the arch and the dome are repugnant to the genius of Hindoo architecture, and have been for many ages practically unused by the Brahminical builders. But the introduction of the arch was the emancipation of architecture from the despotism of material. The arch and the dome are the most beautiful, the most scientific, and the most economical forms of construction; they are the proper methods by which large spaces can be covered—they are indispensable to the usages and recreations of modern public life. Considering the mechanical deficiencies of the Hindoo style, and the predominance of sculptural ornamentation which it exhibits, it appears to be unavailable, under the present Government, for the purposes of the State, and ill-adapted for the common and public use of the collective people. But is the Hindoo style of building, for that reason, to be banished and degraded from all secular use, as is the case at present under the influence of unreflecting and ignorant innovation? Most certainly not. The methods of Hindoo architecture may be practised in moderate dimensions with the greatest advantage, and they are perfectly adapted to the wants of the people. Domestic architecture should be the expression of social institutions and the necessities of climate. The principles of the old-fashioned Indian dwelling were seclusion and shade. For the women, a tranquil and retired retreat; for the men, privacy and repose after the labours of the day, and protection from the scrutiny of grasping authority; for all, shelter from the sun. In its principal features it is the dwelling of the ancient Italians which we have exhumed; it is the dwelling that we admire at Damascus. To the street, a plain exterior pierced by a few apertures, but often furnished with a hospitable porch, supported by stone or wooden columns of quaint design. A narrow door, deeply sculptured, leads into a court surrounded by a pillared verandah on which the private apartments open; behind this, the offices and the habitations of the domestics. The interior court is the charm of the whole; it is the feature which the Indian house-builder should never forsake, and it is just the feature which he is giving up. It forms the most becoming frame for the life by which it is animated. It is in perfect harmony with the figures, the costume, the ornaments, the primitive industry, and the simple furniture of the inhabitants. The columns, the beams, the cornices, the panels of the ceilings, the doors, the pavements, all display the mouldings and patterns in which native art is so rich, and over which the patient native workman delights to linger. The ugly conventional image sculpture of the Pagoda scarcely invades the Indian home, but some pleasant tree natural to the soil will add its rustle and its fragrance. Now if this domestic architecture of other days discovers even in its humility a perfect appropriateness and a powerful attraction, what might not the same architecture become at the present time in the hands of a person of ample means, cultivated taste, and intelligent patriotism? If all the proportions were expanded, if all the materials were selected, if all the designs were chosen for the most exquisite and correct patterns—and of such the whole country is a storehouse—I do not hesitate to assert that nothing in the world could surpass it. Yet what do we see? The moment a native of this country becomes educated and rich he abandons the arts of his forefathers, and imitates the arts of strangers, whom in this respect he might be competent to teach. Nothing is more lamentable than the corruption and confusion of taste which is everywhere apparent, combined with unmistakeable evidence of increasing opulence, and an honourable desire for domestic comforts and decoration. The Hindu and European styles and ornament are all jumbled and piled together. In some thriving provinces a favourite improvement appears to be to build a Doric upper story with plaster pillars of immense diameter over the unpretending porch of the last age with its slender Indian granite shafts. The same malady which infects the middle classes attacks the highest. I had the pleasure of visiting, not long since, in his country residence, a native nobleman who, in addition to all the gifts of birth and fortune, possesses in his person and manners an unusual share of dignity and grace. I need not say that there is a numerous retinue and an overflowing bounty to Brahmins and native strangers. But the Jaghirdar recognises the duty of hospitality in every form, and he has built himself a little palace in a pleasant garden, where he delights to honour his European guests. It may seem ungrateful in me to criticise a dwelling in which I was treated with so much respect and kindness, but I could not repress a sentiment of regret when I found that every trace of native style had disappeared from the most recent example of native building, and that a handsome European villa of spotless chunam had risen among the gray pagodas and choultries and the whispering palm trees.

It is possible that I may be speaking in the presence of some native gentleman who has made a fortune by the exportation of cotton, and who is about to build a new house. The case is not common in Madras, but it is not incredible. If there be such a one here I beseech him to pause before he sanctions the modern "Muster" which I mentally see before me. I say to him discharge your Madras architect and take a maistry from some remote part of the Mofussil where the traditions of the fathers are still preserved. Determine to have a national house, but such a house as an Indian gentleman should inhabit under an honest government in an age of peace, justice and learning—a house in which the light of heaven and reason and freedom can penetrate. Adhere in general to the ancient plan, and especially to the court and colonnade; collect all the best models and patterns of native mouldings and sculpture; use brick of the finest quality from the School of Arts for the exposed surfaces; employ timber for the pillars within, Cuddapah stone for the pillars without, glazed tiles for the floors; make a liberal use of ornamental stucco and painting where the rain cannot penetrate; fill the unglazed apertures with the beautiful tracery of which Indian art offers an unrivalled variety; for glazed windows authentic models may be wanting, but they can be treated in the spirit of the style, and the Government Architect can show you how. Get all your carpets from Vellore, and your stuffs from Madura and Tanjore. Where the Indian patterns fail you, borrow from Mussulmans. Make a sparing use of European furniture, and endeavour to harmonise it with the native forms. But in doing this make everything lofty, light, bright, spacious and accessible.

THE BUILDING NEWS SKETCH-BOOK No. XVI.

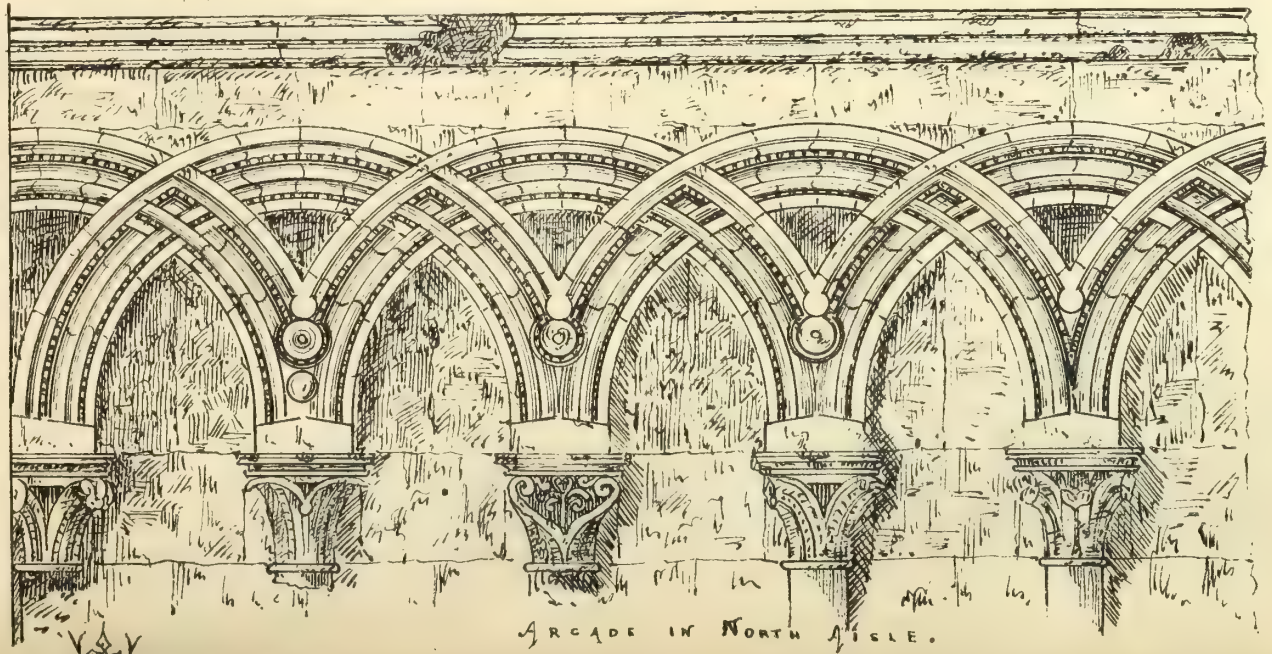
HOLYROOD CHAPEL.

THE west front of Holyrood Chapel had originally a square tower on each side of the great gateway; the north one alone remains, the site of the former being occupied by a portion of the palace built by Charles II. The surviving tower is a good example of the transition from the Romanesque to the Early English, about 1170. On the west and south sides of it there are two stories of arcades, the lowest of which forms the subject of sketch. It is composed of trefoiled arches resting on clustered shafts. A row of spiritedly carved heads tends much to adorn it. The capital A is taken from the arcade above. The two others are from the lancet windows in the north aisle, and the clustered one from the south. The interlaced arcade, partaking somewhat of the Norman, and to which has been assigned the original idea of the Pointed arch, is from the north aisle. J. R. WALKER.

[Mr. Walker's sketch was sent to us on transfer paper.—ED. *B. N.*]

No 2. Arcade on Tower & W.s Front of Holyrood Chapel &c.



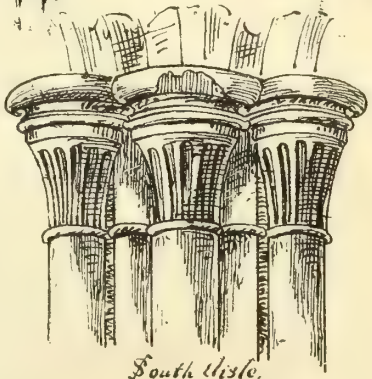


Arcade in North Aisle.

Walker. Del. et lith.



A



South Aisle.

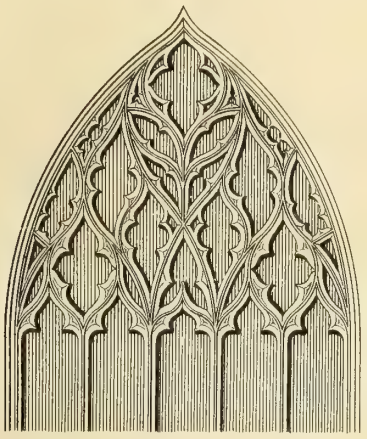


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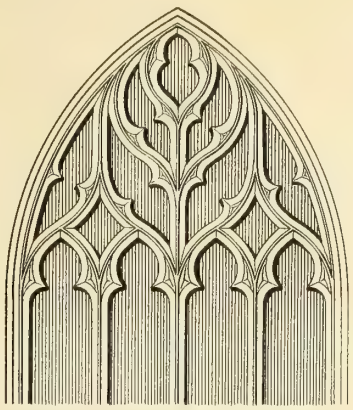


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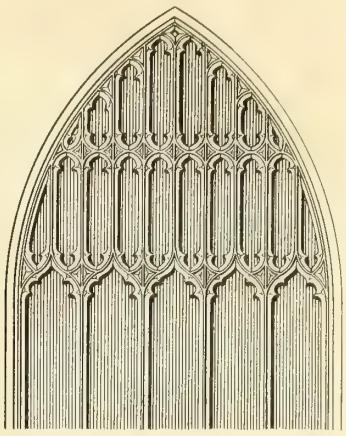
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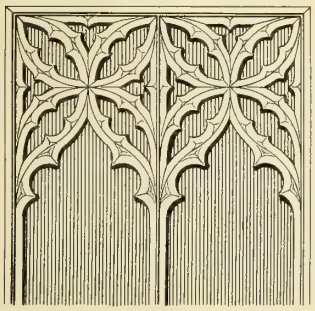
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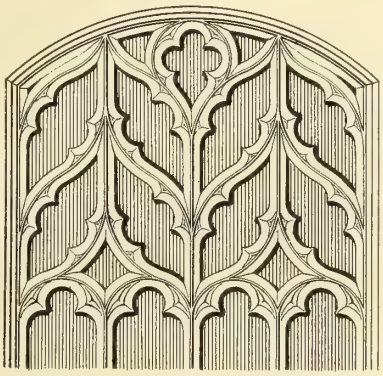
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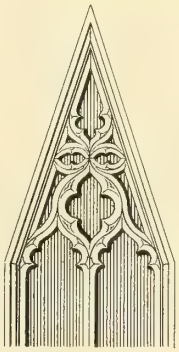
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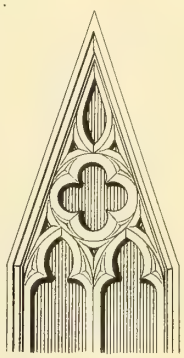
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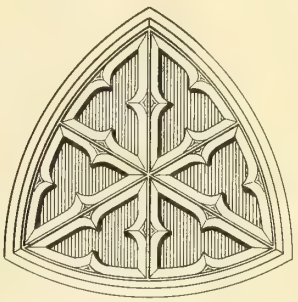
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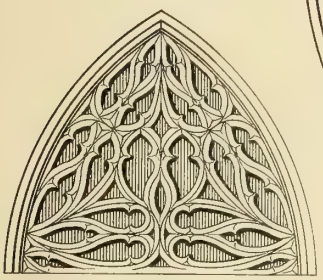
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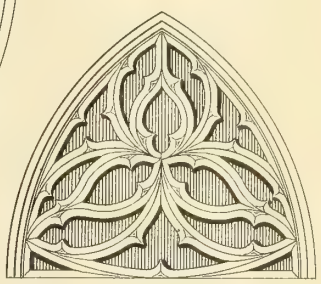
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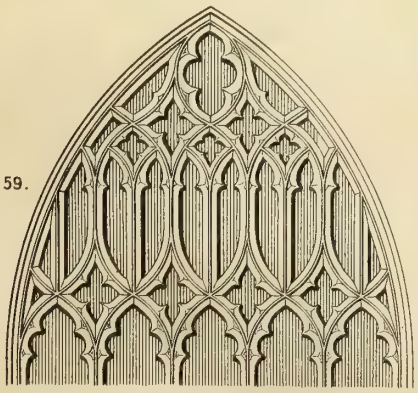
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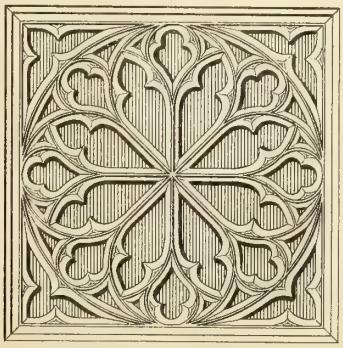
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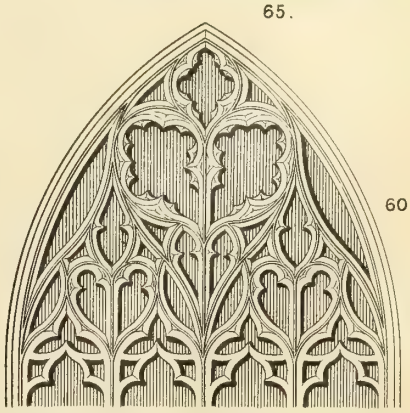
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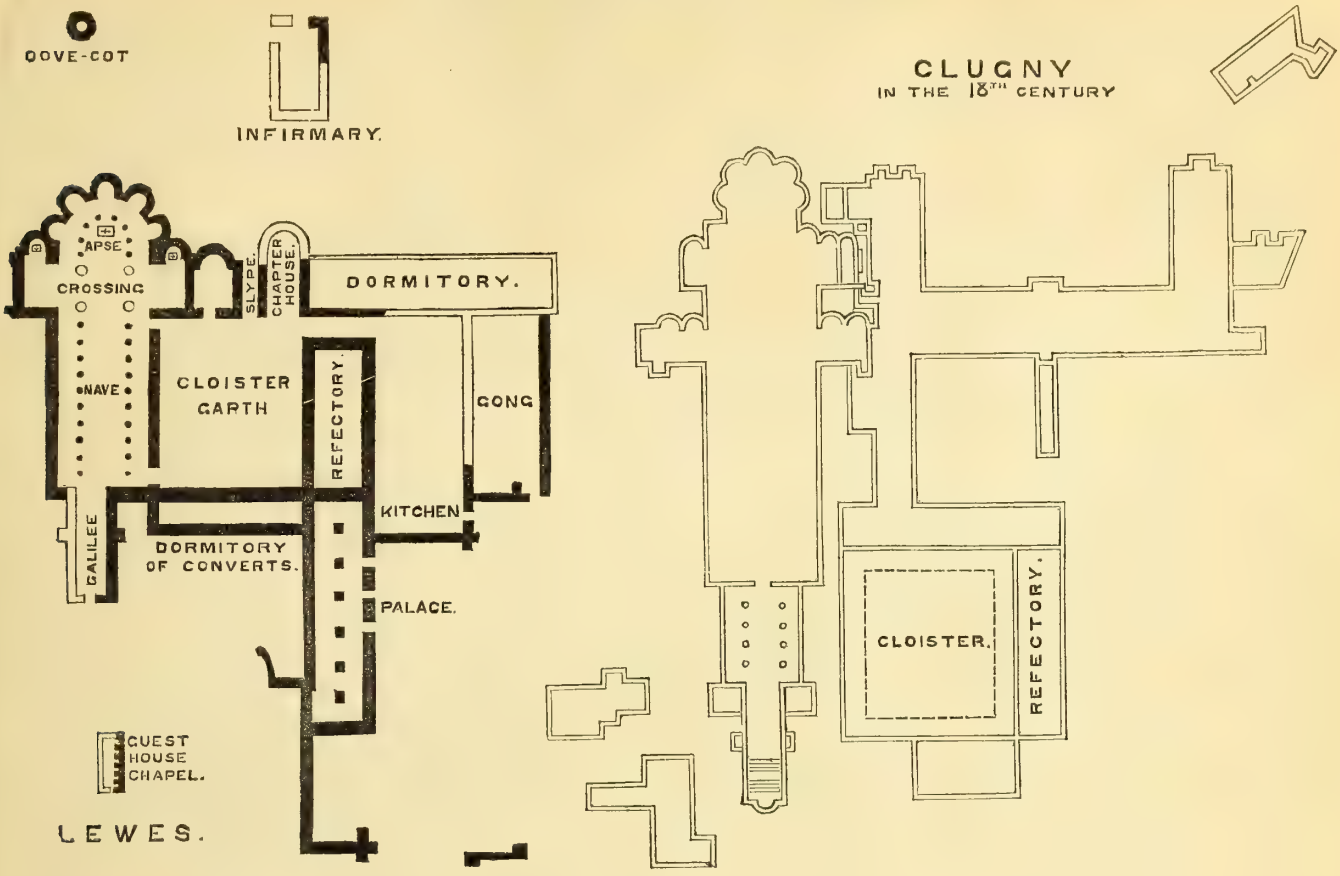
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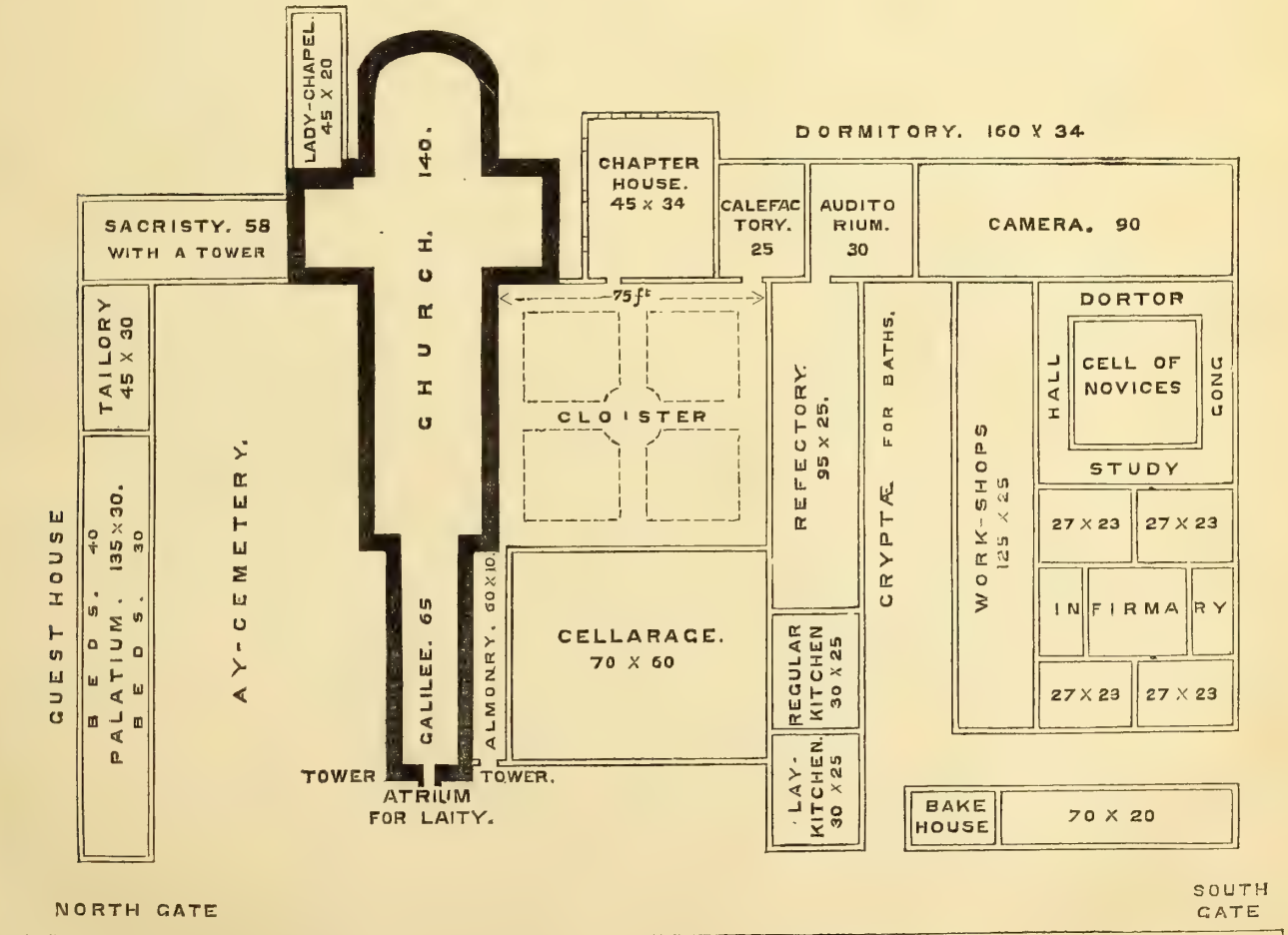
Geo. Green, Lith.

Printed by Whiteman & Bass

ILLUSTRATIONS OF WINDOW TRACERY, No. V.

LEWES PRIORY AND ANCIENT CLUGNY.





PROBABLE GROUND PLAN, ABBEY OF CLUGNY, c. 1007.—As described by the Monk Johannes.

(See page 78.)

LEWES PRIORY AND ANCIENT CLUGNY.

THE Clugniac churches were usually distinguished by their magnificence, as S. Bernard in his "Apology" (1127) thundered against them, denouncing "Oratoriorum immensas altitudines, immoderatas longitudines, supervacuas latitudines, sumptuosas depolitiones." Height, breadth, length, and delicacy of finish all incurred his condemnation. Every minster of the order is in ruins, and Wenlock alone among them affords a blurred shadow of their former glory. Castleacre, Bromholm and Thetford afford a few data to the archæologist. Horton and Lewes retain a few lesser conventual buildings. The minsters were usually of abnormal shape. In France a large porchlike ante-church occurred at Clugny, Vezelay, and Charité sur Loire, and was repeated at Lewes; it resembled a parish church in advance of Sherborne, and the Western Lady Chapels at Glastonbury and Durham. According to strict rule, their churches were dedicated to S. Mary, and were to be devoid of superfluous sculptures, paintings, and organs.

The Church of S. Pancras had a central belfry standing on four large pillars, and 105ft. high; there were two western towers, for Prior William de Neville, who died in 1268, gave 200 marks sterling to complete the two towers in the front of the church; the foundation of this new work had been laid in 1243, on the anniversary of Earl William (MS. Cotton, Lib. A.x.), but at the Dissolution, only one steeple at the front, 90ft. high, is mentioned.

The Lady Chapel was on the north; in the apsidal chapel of the north wing of the transept (as at Canterbury, Bristol, Oxford), Richard, Earl of Arundel, December 5, 49 Edward III., founded two chantries; to be in the chapel of S. Thomas the Martyr, or the Lady Chapel on the north of the great church (Add. M.S. 5706, fo. 177), unless we are to understand that it was a detached building as at Ely, Peterborough, Thetford, and S. Martin des Champs.

The dedications of the five apsidal chapels of the choir are unknown; but we may presume one was that of S. Thomas M., already mentioned; another of S. Martin, where Sir Edward S. John was buried (Add. M.S., u.s.); a third of S. Pancras, near whose image Sir John Falvesley was buried in 1492; a fourth was probably that of S. Egwin, whose wonder-working relics are mentioned in the "Chronicle of Evesham" (p. 61); the fifth, and the altar in the south wing of the transept may have been those of S. John and Holy Cross, as they are specially mentioned, along with the High and Lady Altars, in the "Constitutions of Clugni" (Lib. III., c. xii.)

From the description given by a Commissioner, it would appear that there was an internal apse to the choir, with an arcade of nine bays, formed by eight large pillars; the crossing, with its four pillars, was under the belfry, and the nave was of eleven bays, with ten pillars on either side, and ended in western towers. We thus dispose of the thirty-two pillars, of which Portinari, an Italian, made denizen by Henry VIII., speaks (Cotton M.S., Cleop, E. iv., p. 232, March 24, 1537). "Letter of John Portinari." He brought from London seventeen persons—three carpenters, two smiths, two plummers, and a man to keep the furnace. Ten of them hewed "the walls about." He informs Cromwell that on the Thursday and Friday before they had pulled down a "vault on the right side of the high altar, that was borne up with four great pillars, having about it five chapels, which be compassed in with the walls of lxx. stoks of length, *i.e.*, 210ft." He was then destroying a "higher vault, borne up by four thick or gross pillars, 14ft. from side to side; about in circumference 45ft." He gives the dimensions of the church thus:—

The church is in length 150ft., the height 63ft., the circumference about it 1558ft.

The wall of the fore front, thick, 10ft. The thickness of the steeple wall, 10ft.; the thickness of the walls interno, 5ft. There be in the church thirty-two pillars standing equally from the walls. A high roof made for the bells.

Eight pillars very big, thick 14ft., about 45ft. The other 23 are for the most part 10ft. thick, and 25 about. The height of the greater sort is 42ft., of the other 18ft.

The height of the roof above the altar is 93ft.

In the midst of the church, where the bells did hang, are 105ft. The height of the steeple at the front is 90ft.

The radiating chapels of the choir, forming an eastern coronal; the apsidal chapels of the transept and the two towers of the west front form a most striking correspondence in the ground plans of the minsters of Clugny and Lewes, and this intimate resemblance enables me to fix the conventual arrangements of Lewes, which at first sight, and for some time after appeared to me a hopeless puzzle. I am indebted to Mr. Parsons, of Lewes, for the ground plot. At Clugny there was a vast ante-church, and parallel to this was the Refectory, on the south side of the cloister. At Lewes the Refectory is reproduced in the same position, connected with the palace. The only similar divergence from the usual position of a monastic cloister occurs in the abnormal plan of Rochester, where it lies at the side of the eastern arm of the church.

A fragment of the Norman Gate-house, with the jambs of the arch, remains on the N.W. side of the site; the postern has been re-built near at hand. Buildings of Decorated character formerly abutted on it (Add. M.S. 5677, fo. 18). The next portion of ruin is a beautifully-arcaded wall, with cylindrical shafts, recently discovered, which I should imagine formed part of the Guest House chapel. At some little distance from this spot we reach a coarsely vaulted passage, of the shape of the letter L, and terminating in a well-like space, which by a local figment has been called the lantern, or prison; the cells for delinquents, however, adjoined the Chapter House, and this passage was connected with the cellarage of the Palace or Guest House, measuring 147ft. by 46ft., which was divided into two alleys by an arcade supported by massive pillars, standing upon bases 7ft. square. The eastern half of the south wall remains, with courses of ashlar and herring-bone work. One window retains part of a trefoil head. There are stairs leading from the outside, beyond them is an oblique wall passage, and at the east end, where the Refectory wall abutted upon it, there is a newel staircase.

The western alley of the cloister was 14ft. broad. On the east side of the garth stood the square-shaped Chapter House, in which many coffins, including those of W. de Warenne and Gundrada were discovered. The dormitory intervened between it and the gong.

From a spot between the stairs and the oblique passage ran a wall 59ft. in length, in a southernly direction, it then turned eastward; and this portion remains with a remarkable elliptic arch, and in its north-eastern face has putlog holes.

Before us is now a large line of wall with a pilaster buttress having a set-off and string, and an arched opening into a fine building 63ft. by 18ft., which I imagine was the parlour. The side walls are relieved by large longitudinal arches in one span of 26ft., two broad bands springing from short pillars with chamfered abaci supported the vaulting, and on the N.W. side the outer order of voussoirs of a similar although stilted arch, remains; it communicates with a square chamber, over which probably the dormitory crossed. In the east wall of the parlour are two deeply recessed narrow windows.

Southward of the parlour is the calefactory, 42ft. by 10ft., with the remains of an arch and fireplace at the east end, and apparently a staircase in the north wall. To the south, and parallel with it, is the Gong, 150ft. by 21ft., with buttresses on the south, and both round-headed and square-headed windows; along this wall below the level of the floor, runs the sewer, with a range of putlog holes to receive planking over it.

Sir W. Burrell says the oven, adjoining the Palace as it would seem, was 17ft. diameter, and roofed with tile. Not far from it, at the north side, was a subterranean passage 3ft. wide and 4ft. 6in. in height (this was clearly a sewer). At the east end of the ruins he speaks of noble cellarage, supported by pillars, 68ft. long, 19ft. 6in. broad, and 10ft. high, with square holes in the main walls throughout for ventilation.

Southward of the south arm of the transept was a large Sacristy, apsidal, and containing a well. In front of it was an alley 14ft. wide communicating with its doorway; at the southern end of this alley was a doorway which opened towards the Prior's Lodgings; portions of his hall still remain, and at a distance of 290ft. from the newel staircase of the Palace, to the extreme east, are two walls, of which the southern contains a niche. This building I imagine to have been the east end of the Infirmary Chapel.

On the south-west of the area was a large cruciform Pigeon House; and on the east is a large mound supposed to have been crowned with a Calvary. The materials were dug out of the trench-like excavation called the Dripping Pan. The Priory was surrendered on Nov. 16, 29 Henry VIII. There are some interesting views of in Watson's "Lives of the Earls of Warren."

The following extracts from the rules will throw light on some of the arrangements:—

A guest was required to pay his devotions at the Holy Cross, the High Altar of the choir, S. John's, in the right arm (dextro membro, *.e.*, north transept), and the Lady Altar. Udalrici Cons. Cluniac, lib. III., C. xxii (Migne 149, p. 764). The Claustral Prior, after Compline, stood at the church door to see that the brethren bowed to the altar, and the priest who sprinkled them; he then went his rounds to see that the almonry, regular kitchen, refectory, were locked, and inspect the infirmary, dormitory, and gong, and in winter between nocturns and matins visited the beds and all the altars. (C. vi.) The circators or rounds were to keep up a frequent patrol of the cloisters. (C. vii.) Novices slept in their part of the dormitory and in the gong, "sedes eis in medio duobus circulis ligneis sunt prænotatæ in quibus eis venientibus nullus audeat ut sedet." They received the habit in the sacristy. (C. viii.) They entered the church at the east end (plagam) and the brethren came in at the west; in cloister they sat each on a trunk; in church they had cross forms or footstools; and sometimes sat on the ground. They sat next the wall in cloister, and their masters in the carols (cancellis claustri) (Ibid.). There was an aumbry for books in the cloister. (C. ix.) The chamberlain had his office or camera for clothing. (C. xi.) The tabula was beaten at the cloister door to announce that a monk was dying. (C. xvii.)

The Clugniacs differed from Cistercians in the following divergencies of rule. (Petr Ven., Epist. lib. VI, 17.)

1. They did not acknowledge the diocesan's authority.
2. They did not prostrate at the reception of guests.
3. They did not kneel or prostrate at the hours.
4. They admitted novices to monkhood before the end of a year of probation.
5. They re-admitted fugitive monks, even after three offences, although not in a dying condition.
6. They did not wash their guests' feet.
7. Abbots did not dine with guests.
8. They did not salute or bless their guests.
9. They had more than two general messes in the day.
10. They did no manual labour.
11. They did not uncover or bow to each other in passing.

THE ARRANGEMENTS OF A CLUGNIAC MONASTERY.

Mabillon, in the "Annales Ordinis S. Benedicti," has printed from a M.S. in the Vatican Library a most interesting description of the buildings of a Clugniac Monastery at the beginning of the eleventh century, c. 1007, as described by the monk Johannes, and transmitted for imitation by the Abbot Hugh to the Abbey of S. Mary, Farfa, in the States of the Church in Italy.

The Church of S. Peter and Paul, Clugny, was in Burgundy. Le Noir gives the ground plan in "L'Architecture Monastique," II. 43, reproduced in my "Church and Conventual Arrangement," and exhibiting the characteristic galilee. Expilly states the dimensions to have been 600ft. by 120ft.; the main transept 200ft., and the choir transept 120ft. With this Fargeau may be compared, measuring 200 metres by 40 metres (the nave being 31 metres high, and the aisles 18 metres in height), and containing 60 pillars. Gregory, of Tours, (Hist. c. xiv.) thus describes one of the earliest French churches :—

"It is in length 155ft., in breadth 60ft.; it is in height to the vaulting (camera) 45ft.; it contains 32 windows in the presbytery (altarium), and 20 in the apse (capsum); 41 pillars; in the whole building 52 windows, 120 pillars, 8 doors (3 in the presbytery, 5 in the apse). The church is 150ft. long, 60ft. broad; is 50ft. high in the apse to the vaulting, and has 42 windows, 70 pillars, and 8 doors."

The Clugniac Abbey is thus described by the monk John :—"The church should be 140ft. long and 43ft. in height, and 160 windows. The galilee, or nave, as we say, must be 65ft. long; there should be two towers in the front, with a court beneath where the layfolk should stand in order not to impede the procession; 280ft. must intervene between the south and north gates."

By the rules of the order, "the part of the new Minster on the left side behind the left choir (*i.e.*, the aisle) shall not be open to clerks and layfolk, except on Sundays and great feasts, from tierce to the end of High Mass, except to pilgrims who wish to approach the high altar or matin altar for the sake of devotion, or to make an offering." The retro choir was reserved for the monks' private devotions, and the Matin Altar was dedicated to S. Mary (Stat. Clun., liii., 1039.)

"The sacristy should be 58ft. long, with a tower erected at the upper end (caput). The Lady Chapel (oratorium) must be 45ft. long and 20ft. broad, with walls 24ft. high. The length of the dormitory must be 160ft. by 34ft. in breadth, and have 97 glass windows, as high as a man can reach with the tips of his fingers, the width being 2ft. 6in., and the height of the walls 23ft." By the rules of the order 2, "lxix. two keepers of the dormitory night and day, as complaints had been made of loss of clothes," Migne I., 189 p., 1044. The chapter-house must be 45ft. long and 34ft. broad, with 4 windows to the east, 3 to the north, and on the west 12 balks (balcares), with two pillars in each." These probably enclosed a vestibule. "The parlour (auditorium) must be 30ft. long, and the chamber 90ft. long. The calefactory should be 25ft. broad and of equal height; and from the church door to the calefactory door there should be 75ft. The refectory should be 95ft. long, and 25ft. broad, and the height of the walls 23ft., with 8 windows upon each side 5ft. high and 3ft. in breadth. The regular kitchen should measure 30ft. by 25ft. The lay kitchen must have the same dimensions. The length of the cellarage should be 70ft. by 60ft. The cell of the Almonry should be 60ft. long, corresponding to the width of the cellarage, and 10ft. wide. The infirm should have 6 cells. The first cell must be 27ft. wide by 23ft. long, with 8 beds, and as many cells in the porch along the outer wall of the cell. The fence (claustrum) of each cell should be 12ft. wide. The second, third, and fourth cells should have the same dimensions. The fifth should be smaller, for the assembly of the infirm to wash their feet on Saturday, or for brethren who are hot to change their habit. In the sixth cell the servants should wash the dishes and furniture."

By the rule XIX., in the Clugniac Infirmary, which contains five separate chambers (habitacula) under one roof, the ancient order of silence and conversation should be preserved in the central portion allotted to the brethren and in the upper portion on the south, and so in the cell of the novices, the adjoining cloister, the offices, all the workshops, sacristies, cemeteries, cemetery cloister, and the slype leading to the upper houses which adjoin the great church. (Statuta Clugniac, 1031.)

"Outside of the Refectory there should be twelve crypts and tubs ready, where the brethren may take their baths at proper times."

Shaving was arranged by the chamberlain, who kept the razors in an aumbrey (scrinio) at the entrance of the dormitory. The monks sat in two lines in the ante-bays of the cloister (in cancellis claustri) and next the wall (l. iii., c. xvi.); those who came late were shaved in the calefactory, like the infirm.

There was a general bath before Christmas and Easter, (l. iii., c. xvii. Migne, tom. 149.)

"Adjoining this site should be the novices' cell, formed like a quadrangle; the first division for meditation, the second a refectory, the third a dormitory, and the fourth a gong.

"Between the aforesaid crypts and the novices' cell should be another chamber (cella) for goldsmiths, setters, and glass-workers, 125ft. long by 25ft. broad; in length reaching to the bakery, which should be 90ft. broad and 70ft. long, with a tower built at the head of it."

A curious custom of the Norman founders was that of putting hair of the head and beard into the wax of seals. The author of the "History of St. Augustine's Abbey," says the hairs of the first Earl Warrenne's head remained in the seal in his day (p. 118., Monast Anglic., v. 12.); and so the Earl of Lincoln, who endowed Castleacre, a cell of Lewes says :—"In evidence whereof I have bitten the seal with my teeth; Muriel, my wife, witness, the marks still being visible." The second Earl Warrenne and his brother Ralph had the hairs of their heads cut off with a knife before the altar by Henry, Bishop of Winchester, in token of seizin." (Monast. Anglic., v. 15.)

"Near the Galilee or nave of the church should be built the Palace, 135ft. long and 30ft. wide, to receive guests who came on horseback to the monastery. On one side of the house there must be forty beds with straw pillows, for men only, and on the other side thirty beds for countesses and other respectable women. In the middle of the Palace, tables should be fixed like those in the refectory, to accommodate both men and women. At great feasts the house should be adorned with curtains, palls, and bankers along the seats. In front of it should be another house, 45ft. long and 30ft. broad, reaching lengthways to the sacristy in it; the tailors and cobblers should perform the commands of the chamberlain. Between this house and the sacristy, and the church and Galilee, must be the cemetery for the laity."

Guests were allowed to visit the almonry, cellarage, kitchen, refectory, novices' cells, dormitory, and infirmary, in silence, They might go into the church to pray at the rood, at the high altar, at S. Mary's altar, or S. John's in the north arm; if they arrived late they were not allowed to sit with the abbot at high table (Cons. Clun. l. iii., c. xxii.

The gates were locked after compline, and opened at daylight. (Ibid.)

From the south gate to the north gate, along the west side, should be built a house 280ft. long by 25ft. broad, as stables for horses, and above it a solar for servants and guests of inferior degree.

By the rule, the prison should have a descent by a ladder, a door not visible, and no window. Here is a description of Croylands by the pseudo Ingulphus, whose history is debateable, but which no doubt correctly depicts the monastic arrangements of a Benedictine monastery in a manner as minute and rare as the statement of the dimensions of Clugny. "The granary contained above, all manner of grain, and in the lower part, farm vessels; over the stables of the abbot and guests were the servants' rooms. The whole west side of the abbot's court was enclosed by the stable, granary, and bakehouse, facing the town; on the south was the guest house, with two large chambers; on the east were the jailer's and converts' hall, which, with the abbot's hall, kitchen chamber, and chapel, closed the monks' cloister eastwards; on the north side of the abbey was the great gate, with the poor men's hostel on the east."

Wenlock, Bromholm, Castleacre, and Thetford do not offer a parallel to Clugny as described by the monk Johannes, so close as Lewes. The archæologist will thus be enabled to institute a near comparison between the buildings. The rules laid down for size in the different buildings will, I have no doubt, be of equal interest and value to the architects, as they give some clue to the principle upon which their predecessors worked; they created, we copy.

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THE INDIAN GOVERNMENT AND THE CIVIL ENGINEERS.

OUR readers will remember the charge brought against engineers for receiving commissions on work done by the Indian Government. The Institution of Civil Engineers in Great George-street took up the cudgels, and brought the Indian Government to task in the matter. The following is an extract from a letter from Col. Scratchley, Secretary to the Indian Government, which shows that the charge was made under a misapprehension. The letter says :—

"It has been a subject of much regret to the Governor General in Council, that serious misunderstanding of this Notification should have arisen among Civil Engineers, both in this country and in England. His Excellency in Council, when informed that misconceptions had occurred, lost no time in issuing a circular order to explain the object and origin of the Notification, and to assure the Civil Engineers in the service of the Government in India that nothing had been further from the intention of the Governor General in Council than to impute unworthy practices to the profession. A copy of this circular is annexed.

3. "His Excellency in Council most fully accepts the declaration made by the Council of the Institution of Civil Engineers of the principles which are recognised by the profession in relation to the payments they receive for their services, and he desires to add that there has never been any doubt on the part of the Government of India on this subject, and that the Notification specifically and exclusively referred to the receipt of Commission which was a *legitimate* source of emolument, as being a recognised practice. This is in precise conformity with the declaration of the Council in your letter to the Duke of Argyll, dated 27th October last, and it is a matter of concern to His Excellency in Council that any other impression should have been conveyed by the manner in which the Notification was expressed."

THE SITE FOR THE NEW LAW COURTS.—It seems likely that the question of the site for the New Law Courts will be speedily settled, inasmuch as Her Majesty's Commissioners of Works have issued a notice, under the Courts of Justice Concentration Act, that several houses in Fleet-street east of Temple-bar are to be immediately removed. With that view it is announced that on Wednesday next, the 2nd of February, Messrs. Eversfield and Horne will sell the materials by auction, and the purchasers will have to clear the space forthwith. This will be the 17th sale under the Act, the last having taken place several months ago.

The Surveyor.

INSTITUTION OF SURVEYORS.—THE DISTRIBUTION AND AGRICULTURAL USE OF TOWN SEWAGE.

THE adjourned discussion on this subject was resumed on Monday evening last, the President of the Institution, Mr. JOHN CLUTTON, in the chair.

Mr. GRANTHAM, after detailing the nature of the proceedings of the Committee of the British Association on Sewage Utilisation, proceeded to show that not only was it contrary to all sanitary laws to discharge the sewage of towns into our rivers, but that the only thing that could be done with the sewage to meet the requirements of sanitary science was to put it upon the land. Mr. Grantham, in support of his views, referred to the reports of the Sewage Commission of 1857; the Rivers Commission, 1865; and the Royal Sanitary Commission of November, 1868. As to the quantity of land required for sewage irrigation in proportion to the number of inhabitants, Mr. Grantham said that was one of the points which would receive the full attention of the British Association Committee. He quoted a few returns which had been obtained by the Committee on this head, from which it appeared that the land obtained for irrigation purposes at Aldershot Camp is at the rate of 1 acre to 56 persons; at Bedford, 1 acre to 300 persons; Bury S. Edmunds, 1 acre to 933 persons; Carlisle, 1 acre to 282 persons; Chelmsford, 1 acre to 183; Cheltenham, 1 to 133; Coorley, 1 to 438; Croydon, 1 to 131; Edinburgh, 1 to 565; Epsom, 1 to 45; Norwich, 1 to 58; Rugby, 1 to 138; Swaffham, 1 to 400; Uckfield, 1 to 300. These figures should, however, be taken with some qualification, as in several instances the works to which they refer are incomplete. If he (Mr. Grantham) might give an opinion as to the quantity of land that a town would require, he should say somewhere about 1 acre to every 25 inhabitants would be the quantity required to thoroughly utilise and absorb the sewage, keeping in view and providing for the future probable increase of population. Mr. Grantham next very strongly insisted upon the necessity of obtaining the land required for irrigation purposes permanently. Leasing seems to be most in vogue, but in many cases the land is leased subject to the lessees hereafter purchasing it; while in many cases the land required is purchased outright at the first. Unless great stringency and care were exercised in this respect, local authorities or boards of health would at some time or other either have to vacate the land they had leased—and probably be unable to find other land suited to their purpose—or they would have to pay heavier rentals, owing to the improved character of the property. As to the quantity of sewage which could be applied per acre, nothing definite could be said, for the quantity varied greatly with various kinds of land and different crops. The judicious rotation of crops on any given quantity of land would consume more sewage than the constant repetition of any one crop. As to getting rid of the supply of sewage in winter by means of the land, he thought the plan adopted at Britton's Farm, at Romford, would obviate that—that is, by very deep drainage (5ft. or 6ft.), the effluent water would be carried off into the tanks in the first instance, and then into the river if it is quite clear, so as to cause no nuisance. As to the various chemical strengths of sewage suited to different descriptions of soil, that would be a matter entirely of experiment, and would be taken up by the Committee referred to. The relative suitability and economy of the "separate" and "combined" systems, considered in relation to the question of the utilisation of sewage, would also be matter of inquiry by the Committee. Personally he was in favour of the separate system.

The HON. H. W. PETRE entered at great length into the experiments which had been carried on at Lodge Farm during the last few years under his personal superintendence. After alluding to the cesspool system in London and other large towns, and pointing out that previous to the completion of the main drainage system of London, no farm within twenty miles of London (especially in Essex) was without manure carts, which were sent up by road or rail, and filled with the contents of the London cesspools, and returned to the country again, he said the idea of a complete system of Metropolitan drainage was taken up with little consideration of either cost or consequence. The money was forthcoming, almost without question, but the instant the next inevitable step was proposed to be taken, and the town was told "You have done well so far, but you have not done all that is needful; you must render harmless the mixture you have collected, and use it in the cultivation of the land"—then arose the question "Will it pay?" This question was needless; pay or not pay, it must be done. He had no hesitation in saying that sewage had a certain value as a fertilising agent, but that value should not be estimated by a reference to the cost of the drainage of the town. When the sewage reached the land, estimate its value by comparing the cost of distributing it with the cost of applying other manure to the land. All a town had to do to settle the knotty point of getting rid of its sewage without causing a nuisance was to bow to the necessity of utilising it, then take the necessary land, and tempt an enterprising farmer by a low rental and a lease of the sewage on easy terms. The speaker then went on to deprecate in some measure the experiments made by Mr. Hope on his own land, saying that a field of nine or ten acres, closely hedged in by trees, was not calculated to fairly test the capabilities of sewage irrigation. He thought Mr. Hope expected too much from sewage. In deciding what crops should be grown, it should first be determined whether the application of the sewage to the land was for sanitary, sanitary and commercial, or commercial purposes only. If it was applied for purely sanitary reasons, Italian rye-grass was the proper crop, because with it a larger volume of sewage could be used on a given area of land than with any other crop. If combined sanitary and commercial ends were sought, green crops should be alternated with the grass. If a commercial end only was in view, a minimum quantity of rye-grass should be grown, subservient to green and grain crops. If merely a sanitary result was sought with a given volume of sewage, 100 acres of land would be required. If sanitary and commercial results combined were sought with the same volume of liquid, 150 acres would be necessary; and if a purely commercial aim was kept in view in dealing with the same quantity of sewage, 200 acres would have to be put under cultivation. We had not yet, however, sufficient experience to say precisely that in all seasons and on all lands, a given quantity of sewage would produce a fixed amount of grass, roots, or corn. Mr. Petre suggested the consideration whether too much importance had not been attached to growing rye grass, arising very much from the fact that it was until lately the only known crop that could be successfully cultivated with sewage. The speaker proceeded to show that cropping with rye-grass, beyond a certain proportion, was not an economical mode of using sewage. At Lodge Farm it had been ascertained that sewage was applicable to all varieties of crops. Much had been said during the discussion of this subject as to draining, but Mr. Petre thought that as good drainage was so essential in all good cultivation (whether sewage was used or not) too much stress should not be laid upon the point. Mr. Petre concluded by reading some extracts from a work lately published by him on the subject, detailing several experiments made by him at Lodge Farm with crops.

Colonel EWART said that the kindred branch of the profession (the Civil Engineers) had great cause to be grateful to the Institution for taking up this important question and going into it so fully. The question was one of principles and details. It was important to remember that the excreta used to go upon the land, and that the sewerage system was of comparatively modern growth. Although the rivers had, up to this time, more or less withstood the pollution caused by that system, yet, as the last feather broke the camel's back, so would the continuance of the system sooner or later thoroughly pollute our rivers. Sewage matter, for the future, is not to be discharged into our rivers. In dealing with the drainage of towns, the local authorities look upon the question very much as a matter of £ s. d., and that element must be borne in mind when discussing the relative merits and demerits of the "separate" and "combined" systems. Taking low-level towns, it is very evident that in most cases pumping must be resorted to, and the cost of pumping would, of course, mainly depend on the volume of water required to be raised, which would be much smaller and more constant under the "separate" system than under the other system. Of course, too, the constant, or nearly constant, supply of liquid manure afforded under the separate system was an element in favour of that system which would doubtless be appreciated by farmers. In dealing with the details of the question, the ability of the engineer and surveyor would be shown, because different places must be dealt with according to their varying circumstances, the great thing being that they should be dealt with on right principles.

Mr. HAYWOOD said that he had advocated the present system of metropolitan drainage, by which the sewage was got rid of by casting it into the river; at the same time, he doubted the propriety of making the practice general, and had advocated it for London only because the immediate problem was how to get rid of a nuisance for the convenience of those who had produced it. Although in theory he believed in the "separate" system, he thought that it was impracticable in large towns. People would object to have two sets of drains in their houses. He deprecated the advocacy of one system as applicable to every town. It was the dogmatism of a few local boards which brought the whole question into contempt some years ago.

Mr. HUMBERT said that the "enterprising farmer" referred to by Mr. Petre would be an acquisition to the Watford local board, but he had not yet come forward. The board had obtained land and steam power with a view of utilising their sewage, but, as no one had accepted the offers of the board, the sewage was still being turned into the river, and injunctions were looming in the future.

Mr. WATNEY referred to the sewage farm at Beddington, where, growing only Italian rye grass, a net profit of £8 per acre was realised.

Mr. Tuckett, Mr. Ryde, and Mr. Graham having made a few remarks,

Mr. MENZIES, in reference to Mr. Haywood's remarks on the "separate" system, said that it was not contemplated to have two sets of drains within a house, but to have one set inside and the other outside the dwelling.

Mr. HOPE replied on the whole discussion, and in the course of his remarks he deprecated the generality of the chemical processes sought to be employed for the deodorisation of sewage. The "A B C" process appeared to be the most feasible of all such schemes. It was just possible that such a process would be the best, all circumstances considered, for a town surrounded by valuable building land, or situated in a hollow. Mr. Hope went on to say that when stiff clay is irrigated with sewage, the drains ought to be very much deeper than under ordinary circumstances. The system at Beddington was as bad as it could be, agriculturally. The main part of the farm is always under rye grass, and grass in a bad state, and the result was a very unsatisfactory return. Dr. Carpenter talked of 30 or 36 tons per acre as being a good crop, and accused him (Mr. Hope) of working under high pressure; but high farming is carried out under high pressure, and the more you could get out of an acre the better the farming, and *vice versa*. There was a good deal of misapprehension with regard to the applicability of sewage to different crops. Many persons thought that there was some great difficulty in the application of sewage; that it must be applied under certain peculiar conditions. Nothing of the kind. The possible maximum result for a given acre of land with a given quantity of sewage would depend to a great extent upon the mechanical nature of the soil. Sewage was one of the most miscellaneous of manures in its origin, and one of the most applicable to all plants. It was, of course, necessary with sewage, as with all other manures, to have a rotation of crops, because some plants absorb more of one particular element of the manure than others. But sewage was applicable to every crop. It was simply a question of degree, quantity, and prudent management. After briefly referring to the experiments about to be undertaken by him at Romford, Mr. Hope concluded by referring to the construction of sewers. He thought that the idea that formerly obtained, of making the sewer also a drain for the subsoil, was a mistaken one. The sewer ought to be impervious, and ought to be made of iron pipes; probably in many cases concrete pipes with a lining of iron would be found serviceable, as they had been in France.

The Chairman brought the discussion to a close by a summary of the discussion, in which he tendered the thanks of the Institute to Messrs. Hope and Menzies for bringing the matter forward.

HAWICK ARCHÆOLOGICAL SOCIETY.

THE annual meeting of this society was held last week. The Secretary, in noticing the transactions of the past year, said the contributions to the Museum had not been so important during 1869, but they had, nevertheless, been considerable. There had been nine meetings of the Society, at which the following papers had been read :—"On the Progressive Development of the Idea of Toleration," by Mr. James Hogg (two papers) ; "On Old Edinburgh and its Characters a Hundred Years Ago," by Mr. Richard Cameron, Edinburgh; "The Origin and Early History of the Scottish Dialects, with special reference to the Dialect of Teviotdale," by Mr. J. A. H. Murray, London ; "Extracts from 'Camden's Remaines concerning Britaine,' from Hawick Burgh Records relative to Trades' Incorporations, from the Minute-Book of the Weavers' Incorporation of Galashiels, and from that of the Tailors' Corporation of Jedburgh," by Mr. David Watson ; "An Account of the Discovery of Ancient Human Remains at Teindside, and Account of the Examination of a Sepulchral Cairn at Shaws, Selkirkshire, and of some of the Modes of Burial Practised by Primitive Races," by James Brydone, M.D., M.S.A. Scot. ; "Notes of a Visit to Etins Hall," by Mr. Alex. Michie, Galashiels. Bailie Clark was elected president for the ensuing year ; Councillor Douglas and Mr. George Balmer vice-presidents ; Mr. Frank Hogg, secretary ; and Mr. David Watson, curator. A numerous committee of management was also appointed. It was announced that Professor Elliot, of Liverpool, would at the next meeting read a paper on the geology of the district.

SCHOOLS OF ART.

BRADFORD.—On Thursday week the annual meeting of the School of Art, Bradford, came off. Mr, A. Briggs, honorary secretary, read the annual report, which stated that twelve months ago the committee reported that the school had passed through three years' probation so honourably that they felt themselves bound to carry forward the work that had been so well begun. The students at the school had this year achieved higher honours than on any previous occasion, and the committee hoped that their successors would stimulate their fellow-townsmen to do something towards the support of an institution which reflected much credit on the borough. The second grade examination took place at the High School, Hallfield-road, on the 9th and 10th March, 1869. Drawings were sent up to South Kensington for inspection, of which a number were approved. Attention was drawn to the fact that Bradford had won the only gold medal given by the Department for architectural drawing, and, further, that Bradford stands eighth in the list of schools (the head masters of which have been rewarded with prizes) in which the general amount of work, as tested by examination, considered with reference to the number of students under instruction, was most satisfactory. Considering that the Bradford school only occupies rooms in the High School, and that all the schools before Bradford, and many behind, have rooms of their own, this fact was considered to be a very high honour. The committee considered that in a town like Bradford, with upwards of 120,000 inhabitants, it was not right that a school which could carry off Queen's prizes and silver and gold medals should be merely located in chambers, and they trust that Bradford will do something to provide the school with a suitable home. During the past year, to the ordinary routine of study a "life" class has been added. This class was most successful, and had drawn many pupils. The number of pupils during the year had been 125, being an increase of eleven over the preceding year.

DARLINGTON.—The annual exhibition and conversazione in connection with this institution was held in the Mechanics' Hall, Darlington this week. From the report, read by the secretary, it appeared that since the commencement of the school in 1857, there had been a steady increase in the number of members, and the success of the past year had proved an exception to what had hitherto been the rule. During the year 1868 there was an average increase in the attendance of 14 per cent., and in the past year this had been further augmented by an increase of 8 per cent., and to this was to be added an increase of 8 per cent. to the central school, consequent on the abandonment of the North Road branch school, which had been deemed desirable by reason of a large number of pupils preferring to avail themselves of the superior facilities offered by the central institution. Of the 96 students who presented themselves for examination in March, 57 were successful, and eight were awarded prizes for special proficiency. The drawings sent to London for national competition numbered 300, being the works of 67 students, and of these 17 were selected for award in the elementary class, and in the advanced section the works of Messrs. John Dinsdale and Thomas Spence received prizes, the former being also awarded a free scholarship.

COMPETITIONS.

NEW POLICE OFFICES, IPSWICH.—At the Quarter Sessions held at Ipswich last week, it was resolved that the designs prepared by Mr. W. Oldham Chambers, architect, Lowestoft, for the new police-station in that town should be accepted by the county, and the same were ordered to be sent by the Clerk of the Peace to the Secretary of State forthwith. The arrangement on the ground floor gives accommodation for the petty sessions, with magistrates' retiring-rooms, attorney and witnesses-rooms, lavatory, &c. At the rear of the above, provision is made for six cells, contiguous to which is the constables' sitting-room, coat-room, bedding store, and the usual offices. The superintendent's department contains, parlour, living-room, kitchen, and five bed-rooms, with infirmary for sick prisoners if required. The constables are provided with five bed-rooms, reached by a separate staircase to that used by the superintendent. It is intended to commence the works immediately the plans are approved by the Secretary of State.

THE CORN EXCHANGE.—The insignificant accommodation of Mark Lane Corn Exchange has been long felt by the merchants and traders frequenting it. It is, however, at last proposed to pull down the old building and raise a more commodious and suitable market in its place. A special committee has been appointed, who have requested designs from a few leading architects. The architect whose plans are chosen is to have entrusted to him the carrying out of the works. The second best competitor is to receive for his plans £200, and the third £150. It is stipulated that the new exchange is not to exceed in cost £20,000, exclusive of architect's commission, and all similar expenses. A special condition is also made that the architect is bound to find within a month a builder, with sureties, who is willing to carry out the work and complete the same within twelve months from date of contract. Reference to our Correspondence column will show that there seems to exist some cause of dissatisfaction with the conditions.

Building Intelligence.

CHURCHES AND CHAPELS.

FLECKNEY.—On Wednesday week the restored parish church of Fleckney was re-opened. The old church was a long straight building, open from east to west, with no chancel arch, nor, indeed, anything to break the monotony of its long level roof. The south wall has now been pulled down, and a new aisle built. The old Norman door has, however, been preserved, and a new porch erected. On the north side windows have been inserted, and a vestry built. A chancel arch has been erected, carried on corbels. The whole of the floors and roofs are new, and the interior has been seated with new open pews. The bell turret has been restored to its original form, the whole of the walls repointed, and the windows re-glazed. The contractors were Messrs. Conquest and Son ; the architect, Mr. Charles Kirk, of Sleaford.

LEIGH.—On the 20th inst. a new Primitive Methodist chapel was opened at Leigh, South Lancashire. The style is Norman-Gothic. The original design of Mr. Pritchard, C.E., the architect, was not strictly carried out in all its details, much of the purely ornamental work having to be abandoned owing to the want of sufficient funds to carry it out in its integrity. The building is constructed mainly of brick, with dressings of Edge Fold stone, and of coloured bricks for the doors and windows. The front facing Bradshawgate is composed of pressed brick, tuck-pointed. The form of the interior of the chapel is amphitheatrical, with a semi-chancel at the south end, containing a pannelled Gothic rostrum, and also supplying accommodation for the choir. The roof is on a king-post principal, with segmental collars, well secured with wrought iron straps, bolts, and plates. The chapel is capable of seating between 400 and 500 persons, and underneath is space for a school-room, vestry, and three class-rooms. The entire cost of the building is between £1600 and £1700. Mr. Thomas Bethell, of Earlestown, was the builder.

FUNDENHALL.—The parish church of Fundenhall, Norfolk, was reopened on the 18th inst., after having been closed for some months past for the purpose of entire restoration. The restoration of the nave and tower was undertaken by the parishioners, the architect being Mr. R. M. Phipson. The windows of this portion of the building are all new, but in strict accordance with the style of the originals. The roof is of an exellent pitch, and of very substantial material. In repairing the north doorway a very ancient "stoup" was found, which has been carefully preserved in its original position. The porch is quite new.

THE BAPTISTRY AT S. STEPHEN'S.—The restoration of S. Stephen's Crypt, Palace of Westminster, is completed by the decoration of the Baptistry. The style of architecture dates back to the time of Edward I. The chapel is, perhaps, almost the only portion which remains of the old Palace of Westminster. The walls have been painted with arabesques and figures, and a standard for artificial light, the light of the sun being almost denied to this subterranean chamber, is a fine specimen of metal work, manufactured by Messrs. Hardman, after the style of the time of Queen Eleanor.

BERMONDSEY.—A new church, dedicated to St. Ann, is in course of erection at Bermondsey. It is a very modest-looking little church, built with brick. A small tower, with a stone spire occupies the south-west angle of the building. The internal measurements are 90ft. by 40ft. There is nave, chancel, and side aisles, with organ chamber and vestry. The nave walls are built upon five arches, springing from dwarf columns of iron, with ornamental capitals, and set upon stone bases. The arches are turned with red bricks. Accommodation will be made for about 700 persons. Messrs. Brown, and Robinson are the builders. The estimated cost is £2800.

HERNE CHURCH, KENT.—On Tuesday, the 18th, the chancel of the parish church of S. Martin, at Herne, was re-opened, after a complete re-arrangement of the seats, fittings, &c. Previous to the alterations, the chancel steps were very steep and awkward, and the floor had been brought to within 7½ and 8½ inches of the seats of the sedilia, although these had been raised about 4 inches ; and though there were six of the old stalls remaining, these had been placed in such a position as to render them useless for their proper purpose of seats for those conducting the services. The floor levels have now been re-modelled, rendering the steps of an easier grade, and bringing them into harmony with the sedilia, which have also been restored to their original height, the pavement being laid with Minton's red, black, and buff tiles to pattern, in place of the old coarse red and black tiles in alternate squares. The old altar table has been replaced by a new one of oak, with panels and tracery, and covered with an altar cloth with embroidered super-frontal. Eight new stalls, of oak, have been carved similar to the ancient ones, and, with them, placed according to the original arrangement—viz. : with three returning on each side at the west end of the chancel—and the old bench ends, with carved poppy-heads, have been repaired with new seats and backs. A new oak screen, with panels filled with tracery, has been placed at the entrance to the chancel. A remarkably fine organ (by Lewis) has also been provided. The alterations were carried out under the direction of Mr. Walter F. Dawson, architect, of London ; and the wood carving was done by Mr. Adams, of Herne Bay.

BUILDINGS.

NEW COLLEGE BUILDINGS AT GLASGOW.—The works at the new college buildings on Gilmorehill are making rapid progress, and in some parts are nearly completed. The main building consists of south, east, and north fronts, enclosing a quadrangle, divided into two equal parts by the large hall, which stretches from the centre tower

on the south to the north range of building. The western end of the quadrangle is closed by a row of arched corridors which runs between the north-east and north west towers. The south front of the main building is entirely finished, with the exception of the large tower which is to be placed in the centre, and which is only a little above the level of the roof. A few of the ornamental details in the western part of this front are not yet finished. The east front is also finished externally, with the exception of the anatomical department, at the north-east angle, the plans for which have been considerably altered from the original design. It is now rapidly approaching completion, and part of it is ready for roofing. The exterior of the north front is completed, with the exception of the museum, the walls of which are up and the parapets finished. The west front is not being gone on with at present, as the workshops occupy the position intended for it. As this part of the building consists merely of a corridor running between the two terminal towers on the north-east and north-west, no time will be lost in completing it when begun. The foundations of the great hall which crosses the centre of the quadrangle have been laid, but nothing further is yet done to this part of the building. Beyond the west front is a range of seven houses for the Professors, all of which are finished, with the exception of the inside work. To the north of the north-west angle is another range of four Professors' houses, which are also in the same state of forwardness. At the south-west angle is situated another detached building of two stories in height, containing a dwelling-house for the Principal and one of the Professors. This also is nearly finished.

PRESTON.—On Wednesday week the Markets Committeee of the Corporation of Preston held a meeting to receive and consider the tenders which had been submitted for the erection of the new covered market. According to plans and specifications prepared by Mr. Garlick, and approved by the Corporation (for list of tenders see "Trade News," in this week's BUILDING NEWS), the Committee resolved "That the Council be recommended to proceed with the erection of a covered market in the Orchard, in this borough, and that the tender of Mr. Joseph Clayton for the execution of the work for the sum of £6070 be accepted upon his giving security for the performance of his contract." Mr. Garlick laid before the Committee plans of two sets of water-closets and urinals, proposed to be constructed near the market, the estimated cost of the whole being £310. It was resolved "That the Council be recommended to order the same to be erected."

SOUTHWARK.—We understand that a large Temperance Hall is to be erected in the Blackfriars-road. A portion of the ground on which the old Magdalen Hospital now stands has been secured as a site, and the building will have a frontage of five shops to the Blackfriars-road, and will adjoin the new Peabody dwellings. Besides the large hall, there will be several smaller halls or committee-rooms for the use of benefit societies, &c. This hall will be the first of a series proposed to be erected by the London and Provincial Temperance Halls Company (Limited).

PRESTON.—New gasworks have just been completed at Preston. They are intended to provide for the demands of the probable increase of population in the town for the next twenty years. The works were constructed from the plans of Mr. Green, the company's engineer.

BURY.—On Wednesday week the Bury (Lancashire) Guardians gave their consent for the erection of new imbecile wards at the workhouse. At the meeting of the Visiting Committee on the next day, the following tenders were accepted:—Messrs. Hill and Brothers, Bury, excavating, stonework, draining, and brickwork; Chadwick and Jacques, Heywood, joiners' and carpenters' work; Thomas Cornall, Bury, plumbing and glazing; Jacob Lomax, Bury, plastering and painting; John Kershaw, Heywood, iron and smith' work; James Schofield, Heywood, slating.

ST. LUKE'S WORKHOUSE.—The guardians of the Holborn Union have received the sanction of the Poor Law Board to their proposal for adapting the St. Luke's Workhouse to the purposes of a hospital and infirmary for the sick poor of the Union, and to the alteration of the workhouse in Gray's-inn-lane for the reception of able-bodied paupers. It is intended to at once erect a large block of buildings to contain 450 aged and infirm women at St. Luke's Workhouse, according to the plans prepared by the architect to the Union, Mr. Saxon Snell, and which plans have received the unqualified approval of the Poor Law Board. The building is somewhat similar to those at St. Marylebone Workhouse, lately erected from the designs of the same architect, and which buildings the Poor Law Board Medical Inspector, Dr. Bridges, has reported on in commendatory terms as being in every respect well adapted for the purposes for which they were designed. The proposed buildings at St. Luke's are estimated by the architect to cost £14,000, inclusive of architect's commission, fittings, fixtures, and all other charges of every description. This estimate is at the rate of £27 per bed for the hospital portion of the building, and an additional £2000 if a basement story be added as designed.

GUY'S HOSPITAL.—The new wing of Guy's Hospital has made considerable progress towards completion since its commencement, but is not likely, from present appearances, to be ready for occupation (as was anticipated) in July next. The wing in course of erection will form when completed part of the modern block of building on the east side of the Hospital grounds. The walls are built with brick with stone dressings. A large kitchen is formed in the base. A subway will connect the old and new buildings, so that the nurses will not of necessity have to travel the distance between the buildings in the open air. Messrs. C. and T. Lucas are the builders.

TO CORRESPONDENTS.

RECEIVED.—B. H. and Co.—F. and N.—J. S.—F. H. L.—A. R. and Co.—H. S.—J. F.—G. E. S.—T. C.—S. P.—C. S.—T. E.—R. S.—J. B. and Co.—W. H. T.—J. J.—J. B.

J. W. I.—Get some elementary work on architecture, and read it first.

CHARLES B. JAQUES.—The descriptions came to hand all right.

JAMES ADAMS.—With sketch of Church of S. Nicholas.

J. R. S.—Your enclosure was forwarded to Mr. Redgrave.

WALTER CHESTERTON.—With sketch of doorway of Landerwednach, Cornwall. It is too small.

P. B. ALLEY.—Either not received, or overlooked. Be assured no slight was intended.

G. G.—The best thing you can do is to read the articles now appearing from time to time in "Gothic Tracery" in this paper.

W. H. Littlewood.—Three drawings of Bolton Abbey, Yorkshire. The two coloured drawings are of no use for the photo-litho process.

Correspondence.

THE CORN EXCHANGE COMPETITION.

(To the Editor of THE BUILDING NEWS.)

Sir,—I enclose you copy of a correspondence on this matter for insertion if deemed of sufficient professional importance.—Faithfully yours,

J. R. WHICHCORD.

16, Walbrook, E.C.

16, Walbrook, Jan. 14, 1870.

To the Committee of the Corn Exchange, London.

Gentlemen,—As one of the architects invited to prepare a design for rebuilding the Corn Exchange in Mark-lane, I have been furnished by your secretary with copies of four documents, viz.:—

1. The particulars and conditions of the competition.
2. Plans and section of the existing site.
3. A report to the committee by Messrs. I'Anson and Haywood, and
4. Report by a special committee to the general committee of the Corn Exchange. All which papers I have carefully perused.

Two important points of difficulty occur to me at the outset, viz.:—

1. The preparation of foundations and consequent interference with the vaults under the level of the ground floor, and the compensation that may have to be paid to the tenants thereof.

2. Raising the northern boundary wall, and consequent interference with rights of the owners of adjoining property, and the uncertain cost at which the requisite additional height may be obtained.

Referring to the particulars and conditions of the competition, in the second page is the following clause:—

"The author of the design selected will not be entrusted with the carrying out of his design, nor be entitled to any payment, unless he obtain, if required by the committee, within one calendar month after being so required, a substantial and *bona fide* contractor, with sufficient sureties, to execute the same, as shown and described by the architect's competitive design, within a period not exceeding 12 calendar months from the date of contract, and at a cost not exceeding by more than 10 per cent. the architect's estimate, which is to be sent in with the plans."

And on the fourth page of the same document—

"No estimate for the works, exclusive of architect's commission and salary of the clerk of the works, is to exceed £20,000; and particular attention is requested to this condition and to the clause as to payment of architect."

"The present corn market must be kept available for business during the progress of the works, and all building operations which would interfere with the business of the market must be suspended during the market hours, which are from 10 to 3 on Monday, Wednesday, and Friday of each week."

"It is important that the present cellars under the ground floor should not be interfered with, and no foundations can be carried down below the present ground floor without the consent of the occupying tenants."

I apprehend no competitor will think it practicable to carry out the new works without dealing more or less with the foundations and existing drains, in either of which cases the vaults must be interfered with in greater or lesser degree.

It would be impossible to make an estimate of the cost of foundation works to include compensation to the tenants of the vaults. The latter item may be a moderate one, or a very large sum may have to be paid. I do not understand it to be an instruction of the committee that the several competing architects should make terms with Messrs. Allnutt for such an interference with the vaults as their several designs would demand, neither do I suppose that Messrs. Allnutt would be willing to enter upon such a negotiation, and without doing so, any estimate would be the merest guess.

I suppose every design will contemplate raising the height of the wall on the north side, this will affect the right of light and air to the premises facing it. The adjoining owners have the entire control over any increase of height on this side, and no estimate of the cost of compensation can possibly be made except by an agreement between the committee and the adjoining owners whose ancient easements will be affected This difficulty appears to have been foreseen in Messrs. I'Anson and Haywood's report, clause 40.

As regards the cost at which the Committee appear to consider the works they contemplate can be carried out, I have so far examined the plans sent me as to estimate the space proposed to be covered, which amounts to the large area of about 14,700 superficial feet, and although a considerable portion of this is to be one story building only, yet at both ends, viz., Mark-lane and Seething-lane, lofty structures will have to be erected, and considering the character of the building in question, the necessarily expensive arrangement for ventilation and warming that will have to be adopted, I am of opinion the sum of £20,000 is a very low estimate, leaving altogether out of the question all items of compensation to tenants or adjoining owners, or the additional cost of carrying out the works, as suggested in the 4th page of the Instructions, in which building operations are to be suspended for five hours, three days in every week, which of itself will considerably increase the cost of the work.

I venture to suggest the committee should settle these questions or otherwise direct the competition to proceed on the hypothesis that the old foundation walls at the level of the ground floor are sufficiently strong to bear the weight of the new building and also of a roof without intermediate columns, and that the drainage can be provided without interfering with the vaults, and in the event of this not being found to be the fact when the works are commenced, the cost incident to any additional foundation work, including tenants' compensation, should be recognised and admitted as extra work, while as regards the question of light and air, precise instructions should be given as to the additional height the northern boundary is to be carried. Without such instructions the competing architects cannot possibly deal with foundations, or increase the existing height of the buildings and have any reasonable certainty of the cost at which their design can be executed, or, indeed, if it can be carried into execution at all.—I am, Gentlemen, your obedient servant,

JOHN WHICHCORD.

Secretary's Office, Corn Exchange,
London, 20th January, 1870.

John Whichcord, Esq.

Sir,—I am directed to inform you that in consequence of various communications received from certain of the gentlemen who have been invited to send in designs for rebuilding this Exchange, a meeting of the special committee has been convened, and the following resolutions passed:—

"The Committee resolve to release the architects from the responsibility of estimating the cost of compensation to the occupying tenant or tenants of the vaults, and as respects the cost of any structural works to the foundations, that the estimate of such cost may also be omitted from the architects' estimate."

"That as regards any obstruction of lights, whatever they may be, the committee do not consider it necessary to give any fresh directions."

I have only further to add, to reply to yours of the 4th instant, that you are in error in supposing that "a lofty structure has to be erected at the Seething-lane end." The building there is intended to stand, but you are invited to show a better adaptation of a portion of the ground floor.—I am, Sir, your obedient servant,

HENRY ROBINS, Secretary.

16, Walbrook, E.C.,
January 24th, 1870.

LONDON CORN EXCHANGE COMPETITION.

Sir,—I beg to acknowledge the receipt of your letter of the 20th inst., in which you tell me "That as regards any obstruction of lights, whatever they may be, the committee do not consider it necessary to give any further direction."

Questions of right of light and air in the City have of late become very formidable and frequent, in many cases absolutely preventing any increase in height, and in others entailing costs bearing a large proportion to the entire outlay on new buildings.

Under these circumstances I am so strongly of opinion that it is impracticable to design a building on the land in question with any certainty that it can be carried into execution, or to estimate its cost, unless all questions of adjoining owners' rights are excluded from the competition, that I beg to retire from the number of competing architects.

As the matter is one of general importance to the architectural profession, and especially to those members whose practice has not been in the City of London, I propose to send a copy of our correspondence to the professional press, which I trust will be in accordance with the wishes of the committee.—I beg to remain, Sir, your obedient servant,

JOHN WHICHCORD

Henry Robins, Esq., Secretary

PLYMOUTH GUILDHALL COMPETITION.—WHAT IS A REFEREE?

SIR,—Can you inform me what are the proper functions of a referee? Should an architect, in accepting such a position, consent to his duties being limited to merely assisting, where a committee or council reserve to themselves the right of determining the award? And, if so, can this be considered professional adjudication?

In the absence of any special ruling of the Institute on competition practice, guided solely by my own ideas on the subject, and believing that professional adjudication is of the first importance, I hold that the functions of a referee in an architectural competition are those of an arbitrator between the competitors and the promoters; and that the office should not be accepted on any other understanding. And, as it is the competiters who require that a third person should be called in to judge between them and the promoters, I consider that the competitors, more particularly, should not only accept the award of the referee, but that they are in honour bound to resist the slightest interference with it. If the professional award is to be set aside, what is to become of professional adjudication?

In protesting against the interference of the Plymouth Town Council with Mr. Waterhouse's award (by which the positions of the second and third designs were reversed), I have endeavoured to maintain this position. I may be wrong—at all events, I am not supported in my views, that I am aware of, by the late Hon. Sec. to the Institute, to whom the referee awarded the third premium, and who, from his late position, should be, of all men, the most alive to a proper sense of professional obligations. WM. HENRY LYNN.

Belfast, Jan. 25, 1870.

THE BUILDING NEWS SKETCH BOOK.

SIR,—I regret that your correspondents last week should have misunderstood my intention with regard to the above subject. Let me explain that I consider the Sketch Book in its present form of a very high practical value and great historic interest, and that I should on no account wish anything to interfere with the drawings of ancient buildings. On the contrary, it would give me very great pleasure to see them come out much more quickly than hitherto. At the commencement you said that you hoped to be able to publish the sketches on an average once a week; but in nearly six months they have only numbered 15. It is probably this fact which has attracted the suggestions of the last few weeks, as modern buildings, copies of photographs, increasing the limit to number of sketches from each contributor, &c.; and this it is which induced me to propose a supplementary series of designs, which, I think, would in no way interfere with your present admirable Sketch Book. It would attract a different and a much larger circle of contributors, and is at least more suitable to the present season than out of door sketching. It might form a second part to each volume, separately numbered and distinct from the other.

Mr. W. Clement Williams remarks that your pages are already plentifully supplied with modern designs; but these, it may be observed, are entirely buildings already executed, or about to be carried into execution.

Now, it is a fact that many of an architect's best designs are disliked by his client. And what is the consequence of this? the architect gives up designing well, and designs to please his client. The architect follows, but does not lead, the public taste. A painter or a sculptor may paint or carve, and excite admiration, but an architect must excite admiration before he is allowed to build. The institution of such a sketch book would lend a powerful helping hand to merit as opposed to influence.—I am, &c.,

CONTRIBUTOR.

MIDLAND COUNTIES' MIDDLE CLASS IDIOT ASYLUM.

SIR,—Kindly allow me space to say in reference to this competition, that Mr. A. Waterhouse is now engaged in examining the designs, having been nominated consulting architect by a large majority of the competitors. The plans will be exhibited in the Athenæum Hall, Birmingham, on Monday, Jan. 31 and the five following days. Cards to view may be had from.—Yours obediently,

W. G. BLATCH, Secretary.

65, Waterloo-street, Birmingham, Jan. 26, 1870.

Intercommunication.

QUESTIONS.

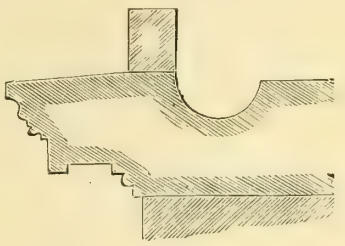
[1750.]—CHURCH LAMPS.—Can you, through the medium of your columns, inform me of the best method of lighting a small country church where gas is not obtainable; whether any of the mineral oils have been found to answer, and what is the best form of lamp for the purpose?—E. T. P.

[1751.]—ALGEBRA.—I shall be glad if someone would name the best work on algebra for a young beginner, and where it could be obtained.—PLUS.

[1752.]—BALL ROOM FLOORS.—Will some one kindly inform me whether a ball room floor has usually more spring than another, and, if so, how it is differently constructed?—TERPSICHORE.

[1753.]—PRESERVING EXTERNAL STONEWORK FROM DECAY.—Will any of your correspondents kindly inform me what process has been found most successful for preserving external stonework from decay?—W. B.

[1754.]—ASHLAR WALLING.—I should be glad if you or some of your readers who have had practical experience in such matters would favour me with information on the subjects mentioned below:—1. In a wall formed of ashlar facing, with 16″ cavity brick wall as backing, what are the best means of rendering the backing equally solid with the facing? The courses of ashlar are about 9in. deep, and about 5in. on bed, and it is often found that walls of this kind become convex on the face, there being so many more mortar joints in the backing. 2. Whether in a wall such as I refer to the cavity should be 4½in. or 9in. from the inside? 3. What number of bond or through stones there should be, and whether these



should go through the entire thickness of the wall across the cavity? 4. What cramps or dowels are required in the ashlar work? 5. The best means of securing the blocking to stone cornices, as sketch.—A. M. B. G.

[1755.]—WEIGHT OF DRY TIMBER.—Will anyone kindly inform me what weight timber should be per cubic foot when dry and well seasoned so that it will not shrink after it is fixed in a cottage, as I find is too often the case? Names of timbers: S. John's pine, oak, sycamore, birch, pitch pine, red pine, spruce deal.—DRY TIMBER.

[1756.]—TIMBER ROOF.—Will any of your readers kindly give information respecting the liability of timber, in roof or floor especially, to take fire when exposed to blasts of hot air unaccompanied with any flame or even sparks, and also, when in contact with any heated brick or stone work, which, however, never attains to a red heat?—SUBSCRIBER.

[1757.]—MAGNETIC AND TRUE MERIDIAN.—Will any of the numerous readers of THE BUILDING NEWS kindly inform me as to what is the "variation of the compass" at Worcester for the time being, and the most simple method of calculating the amount of such variation. I think it is about 24 degrees west.—B. I.

[1758.]—MEASUREMENT OF STONE WALLING.—I shall feel obliged to any of your readers for answer to the following question. A party requires a stone wall to be built round a garden, to be worked in courses, and copped face on both sides. A mason offers to supply labour for the same at per perch. How should the wall be measured, and what is the contents of a perch of such walling?—T. C. T.

REPLIES

[1732.]—HURST'S HANDBOOK.—In reply to "H. A. K's" inquiry respecting the correctness of Hurst's formula on page 75, as far as it relates to the comparisons of wrought iron with brass and copper, I am of opinion that if he had given himself a little trouble, and carefully gone into the tables following, he would have come to the conclusion that the errata should read as follows:—

Weight of wrought iron × 1·0825 = brass.
" " × 1·1443 = copper.

W. R. W.

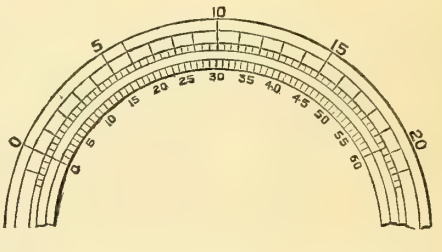
[1738.]—STOVE.—I doubt if "J. H." will get a stove to consume its own smoke without a flue, nor do I think it would prove a desirable possession though he could. I will give him the benefit of my experience, which may be of some use both to him and others. In the beginning of the present winter two gentlemen asked me if I could devise any way of warming their halls, the grand difficulty being "no flues." I saw no possible way of getting flues except in such a way as would much destroy the appearance of the houses. The scheme was on the point of being abandoned, when a friend suggested the placing of the stove in the basement, and sending up the heated air by a grating in the floor. I saw immediately that that would do, and got two of Musgrave's, of Belfast, rough slow combustion stoves, and built them into brick cases, with about a 3in. air space all round, and carried up the heated air through gratings in the floors, in sheet iron tubes about 12″ × 6″. I took out the dining room grates and built in sheet iron smoke flues up the backs to 2ft. or so above the chimney breasts, replaced the grates, and the whole was complete. Both are giving great satisfaction, and are completely successful. I shall be happy to give "J. H." more details in private if he wants them.—D. H., St. Andrews, Scotland.

[1738.]—STOVE.—The reply of M. Butler will, I fear, disappoint "J. H." There is no occasion to send to Belfast for a stove with a descending flue; these can be procured from any respectable ironmonger in the kingdom. What "J. H." requires is a fuel stove that acts without any flue. Of these there are several; one of the best, Joyce's patent, can be obtained in London, requires no flue, but the fuel is prepared, and costs about the same as the best coal.—W. R. A., Uckfield.

[1740.]—A QUERY.—Your signature in law is worth nothing; personally you are not liable for the price of the books. It remains to be seen whether your guardians are. This will depend upon the nature of the publications you agreed to take in. Are they necessaries or luxuries? It is just possible that a work of an educational or scientific character might be regarded as a necessary, whereas a "Jack Sheppard," or "Lives of Celebrated Highwaymen" would certainly be considered "luxuries."—CLERK.

[1742.]—FLOOR PLATE.—As "X. M." has still some anxiety respecting the expansion of his continuous bar of iron, and is not reassured by my last answer, I will put it in another form. Let us first consider what would be the actual expansion and construction of a wrought iron bar of a length of 150ft., and to be on the safe side, let us assume the extreme limits of the temperature to be from 32° to 212°, that is, to have a range of 180°. Multiplying the length of the bar G, the proper constant, the calculation becomes 150 × 0·0012 = 0·180 of a foot, equal to 2·16in. If the bar be allowed to expand the half of this at each end, that is, if its ends be allowed a play of 1·08in., no harm can possibly result from making the bar in one continuous length. The width and thickness of the bar being inconsiderable compared with its length, the superficial and cubical expansions may be neglected as wholly inappreciable in practice. No weight that could be put upon the bar would prevent its expansion or contraction, those natural forces being irresistible.—B. B.

[1744.]—THEODOLITE.—It is evident that "Subscriber" has learned to read a theodolite by rote without understanding the principle of the vernier. The general rule for all verniers is that a certain length of it, according to the precision required, is divided into a certain number of parts, exceeding by one division the same length which is divided on the primary scale, or the limb of the theodolite. Thus, if a length L on the primary scale by divided into N division, the same length on the vernier scale will be divided into N + 1 divisions. Thus, on the limb of a theodolite which reads to single minutes, the primary scale is divided to half degrees, or 30 minutes, and a length equal to 29 of these minutes is divided on the vernier scale to 30 parts. Consequently, the difference between the length of a division on the vernier and on the primary scale is always equal to 1-30th of the half degree, and, therefore, in this case, the vernier reads to single minutes. Again, if it is required to construct a vernier that shall read to 20 seconds, the primary scale in the first place s divided not to half degrees, but to 20 minutes, as shown in



the diagram. A length equal to 59 of these divisions is divided on the vernier scale into 60 subdivisions. Consequently, the length of a division on the vernier scale is 1-60th less than one upon the primary scale, which is equal to 20 seconds. The vernier, therefore, is said to read to 20 seconds. I would strongly advise "Subscriber" to construct on paper a few examples of verniers reading to various degrees of precision, and he will thus familiarise himself with the subject.—THEODOLITE.

Our Office Table.

THE DIRECTORSHIP OF WORKS AND BUILDINGS.—It is stated that Captain Douglas Galton has been appointed to the Directorship of Works and Buildings, a new office under the First Commissioner of Works. The Assistant Under-Secretaryship of State in the War Office, at present filled by Captain Galton, will be abolished.

THE INSTITUTION OF CIVIL ENGINEERS.—At the meeting of this Society on Tuesday, the 11th inst., Mr. Charles B. Vignolles, F.R.S., President, in the chair, five candidates were balloted for and declared to be duly elected, viz.: Mr. Alfred Andrew Langley, Engineer and Manager to the Hereford, Hay and Brecon Railway, Mr. Robert White, First Class Engineer upon the Great Southern of India Railway, and Mr. Edmund Wragge, Chief Engineer of the Toronto, Grey, and Bruce, and the Toronto and Nipissing Railways in Canada, as Members; and Mr. William Rawlinson, Engineer and Manager of the Brazilian Street Railway Company, and Mr. Charles Willman, Middlesbrough, as Associates. A report was brought up from the Council stating that, under the provisions of Sect. IV. of the Bye-laws, the following Candidates had recently been admitted Students of the Institution:—William Frederick Alphonse Archibald, B.A., Albert Josiah Hess, Andrew Innes Liddell, Walter Allingham Magnus, and Henry Goulton Sketchley.

THE CATASTROPHE AT LIVERPOOL.—The origin of the fearful accident on Sunday last appears to be unknown. According to the clergy, the report at first circulated that a cry of "Fire" had been raised is untrue. At a meeting on Wednesday night, the Mayor of Liverpool said he did not believe the calamity was caused by the cry of fire. At the Town Council held on the same day, it was stated that in the next Bill which would be brought before Parliament for corporate improvements, clauses for the better protection of warehouses against accident would be introduced, as would also provisions for the

providing of sufficient m ans of ingress and egress to all public buildings, churches, theatres, &c. If this be done, some good will have been effected by the great calamity.

STREET TRAMWAYS.—The construction of tramways along the principal streets in the metropolis and the several large towns in England appears to be very popular at present, there being prepared for the approaching Parliamentary session no less than 20 applications for bills of this character, seven of which are for powers to lay down lines in different parts of the metropolis, and are respectively entitled the North Metropolitan, North London, Metropolitan Street, Pimlico, Peckham, and Greenwich Street, East London, and Pimlico, Peckham, and Greenwich Street (various powers) Tramways. The remaining portion of these applications are for tramways in Liverpool, Birmingham, Manchester, Leeds, Plymouth, Portsmouth, Worcester, and Wallasey, competing companies being in the field for possession of the streets in the four first-named towns.

BRADFORD COLLEGE OF SCIENCE.—Lord F. Cavendish presided on Monday at a meeting, held at Bradford, of the General Science College Committee, appointed at the meeting held in Leeds a few months ago to promote the establishment of a College of Science for Yorkshire. The report which the sub-committee had prepared, explained that the College was designed for the use of persons who intended to engage as foremen, managers, &c., in operations connected with engineering, manufactures, mining, and metallurgy, and for the training of teachers of technical science. To render the College accessible to those unable to pay the fees, it was suggested that exhibitions and scholarships should be established, to be competed for by artisans and students in Mechanics' and kindred institutions. The college buildings to be erected, it was suggested, should provide accommodation for from 300 to 400 students, but that no steps should be taken for raising funds until the scheme had been finally adopted by the General Science College Committee. The report was adopted, and the Committee were empowered to make inquiries throughout the country as to the conduct of similar institutions, and to report to another meeting.

CORNISH GRANITE WORKERS.—A correspondent of the *West Briton* writes:—"I regret to hear of many very important contracts for granite being given to the French and other contractors, which, with a little concession on the part of working men, might have been obtained for Cornwall. The consequence is that a large amount of capital is lying idle, and many men are out of employ, the masters' works being comparatively idle. The granite masons formerly had 4s. 6d. a day; they then insisted on having 5s., with the additional privilege of having all their tools sharpened at the expense of their employers. But even this concession was not sufficient, and nothing less than 5s. 6d. a-day would satisfy some of the men. The masters found this far beyond even what would give them a new shilling for an old one, and consequently decline to take orders which would involve them in a loss instead of a profit."

PUBLIC BUILDINGS.—"An Architect" in a letter says:—"The 18th and 19th of Victoria, cap. 122, part 30, provides for the strong construction of the building, and makes the district surveyor responsible in this respect, but it defines no rules to provide for sufficient ingress and egress proportionate to the capacity of the building, nor does it insist on all doors of ingress and egress opening *outwards*, especially for the latter purpose. A provision enacting this requisite for public safety is highly necessary. Doors of egress opening inwards, in any sudden alarm, from the rush and pressure upon them, are firmly closed, and the most frightful consequences ensue. At a time of much provisional legislation, is is surprising how little public safety has been cared for in case of any sudden emergency occurring during the vast assemblages in our public buildings. The Metropolitan Board has a Bill in preparation for many purposes, and let us hope this important subject may also have their consideration."

AN ARCHITECT'S TRAVELLING EXPENSES.—At the last weekly meeting of the Chorley Board of Guardians, Mr. J. J. Bradshaw, architect, of Bolton, and Mr. R. Pickup, contractor for the new workhouse, attended to sign their respective deeds of contract. The chairman (Mr. W. Lawrence) explained that the deed of the contractor provided that he should finish the building by Jan. 1, 1872, under a fine of £10 per week; while the architect's deed provided that he should have 5 per cent. upon the outlay, which should cover all travelling expenses. A long discussion took place in reference to a bill of £20 9s. 6d., which had been sent in by the architect for expenses incurred to London before the agreement had been made with the late Mr. Leigh Hall, some of the Guardians contending that the 5 per cent. should include all. Mr. Bradshaw said travelling expenses meant simply those between Chorley and Bolton. The charge, however, applying to himself (about £5) he would forego, but he said he should have to consult the executors of the late Mr. Hall with reference to the other part. The deeds were then signed.

Chips.

The Improvement Committee of the Liverpool Town Council, in view of the present depression in trade and the dread of additional local taxation which prevails in the town, have decided to recommend the Council to set aside certain proposed town improvements which would cost about £535,530.

The Hampstead Fever Hospital is now nearly completed, and was opened for the admission of patients on Monday last.

Tenders are invited for the erection of new police offices at Blackburn.

The death of Mr. Henry Saward, late Town Clerk of Blackburn, is announced.

The Government having decided upon converting Millbank Penitentiary into a general military prison, all soldiers whose terms of imprisonment exceed 56 days will be forwarded henceforth to that destination, and the various military prisons at different stations in England will be abolished.

Mr. Gladstone has been appointed organist of Chichester Cathedral, in the place of Mr. Thorne, who, we understand, is coming to town.

Lord Lilford, patron of the living, has contributed £1000 to the fund for the restoration of the parish church of Leigh, Lancashire. The architect estimates that about £9000 will be required, and towards this sum £5200 has been promised.

The marble which the Pope has given from the Emporium for the restoration of Cologne Cathedral and some other German churches, has been shipped at Civita Vecchia.

MEETINGS FOR THE ENSUING WEEK.

MONDAY.—Royal Institute of British Architects. "On the Ornamental Features of Arab Architecture." By Mr. J. D. Crace, Contributing Visitor.

TUESDAY.—Institution of Civil Engineers. "On the Statistics of Railway Expenditure and Income, and their Bearing on Future Railway Policy and Management." By Mr. John Thornhill Harrison, M. Inst. C.E. 8.

" Royal Institution. "On the Architecture of the Human Body." By Professor Humphry, M.D., F.R.S. 3.

WEDNESDAY.—Society of Arts. "On Recent Improvements in Small Arms." By Captain O'Hea. 8.

THURSDAY.—Royal Institution. "On the Chemistry of Vegetable Productions." By Professor Odling, F.R.S. 3.

" Linnæan Society. 8.

" Society of Antiquaries. 8.30.

FRIDAY.—Royal Institution. "A Talk Respecting Verona and its Rivers." By Professor Ruskin, M.R.I. 9.

SATURDAY.—Associated Arts Institute. Paper on "Ornamental Art." By Henry O'Neil, A.R.A. 8.15.

" Royal Institution. On Meteorology. By Robert Scott, Esq., M.A. 3.

Trade News

TENDERS.

BRISTOL.—For planting, &c., the new cemetery. Mr. Henry Masters, architect.

J. Maul and Sons	£248
J Sealy and Son	160
J. Nelson (accepted)	133
Garraway and Co. (informal)	130

BRISTOL.—For the erection of the buildings, roads, and boundaries, of the new cemetery. Mr. Henry Masters, architect:—

Davis and Son	£5898
J. Dinent (informal)	5848
J. Storkey	5800
Eastbrook and Son	5620
Wilkins and Son	5555
W. Baker (informal)	5550
W. Kingstone (informal)	5492
Beven and Son	4998
J. W. Brown	4799
J. P. Stevens	4686
W. Brock (accepted)	4532

MICKLEHAM (Surrey).—For decorator's work, Juniper Hall, for Mr. F. Richardson. Mr. G. Legg, architect:—

Simpson and Sons	£584

HARLEY-STREET.—Tenders for alterations and repairs to No. 85, Harley-street. Mr. W. A. Baker, architect. Quantities prepared by Messrs. Richardson and Waghorn:—

Cowland	£1416

HAMPSTEAD.—Tenders for cabinet fittings to the Adam and Eve Tavern, Hampstead-road. Messrs. Richardson and Waghorn, architects:—

Newman and Mann	£547
Scrivener and White	512
Plasterers' Work.	
Buckley and Beach	£164
Connolly	163
Helling	154
Sanders and Son	139

LIMEHOUSE.—For sundry repairs, &c., to premises at Limehouse. Mr. S. G. Foulkes, surveyor, 23A, Red Lion-square:—

J Woodward	£390
E. Brown (accepted)	260

PORTLAND-PLACE.—Tenders for alterations and repairs to No. 48, Portland-place. Mr. W. A. Baker, architect. Quantities estimated by Messrs. Richardson and Waghorn:—

Haward Bros.	£3990
Clark and Mannooch	3479
Keyes and Head	3435
Simpson and Son	3380
Phillips and Son	3267
Ebbs and Son	3249

PRESTON.—For new covered market for Preston, from plans and specifications prepared by Mr. Garlick:—

J. Tildesley, Bilston	£9480	0	0
Govan Iron Foundry Co., Glasgow	9394	1	4
D. Howarth, Rochdale	8800	0	0
E. Wrightson and Co., Stockton-on-Tees	7975	0	0
T. Piggott and Co., Birmingham	7800	0	0
Newton, Chambers and Co., Sheffield	7500	0	0
Preston Waggon and Iron Co.	7468	0	0
E. Bickerstaffe, Preston	7100	0	0
J. Forster, Preston	7070	12	0
P. Eddleston and Co., Accrington	6850	0	0
W. Allsup, Preston	6687	0	0
J. Clayton, Preston (accepted)	6070	0	0

SOUTHSEA.—Tenders for erection of baths and assembly rooms at Southsea, Hants, for the Southsea Baths and Rooms Company (Limited). Messrs. Davis and Emanuel, 2, Finsbury-circus, City, architects.

General Contract, No. 1, for Builders' Work.

Doverwood and Co., Upper Norwood	£12424
Bramble Bros., Southsea	10250
Henry Pook, Southsea	9920
B. E. Nightingale, London	9876
Samuel Stevens, Southampton	9548
William Larcome, Southsea	9258
George Burbidge, Southsea	9185
T. W. Quick, Southsea	9153
William Ward, Portsea	9079
George Absalom, Southsea	8850
W. R. and C. Light, Portsmouth	8651
H. J. Sandars, Southampton	8499
George Barnes, Portsea	8370
Neave and Fry, Portsmouth	8333
Andrew Nance, Portsea	8250
Alfred Smith, Portsea	7395

SOUTHSEA.—For works to baths and assembly rooms at Southsea, Hants, for the Southsea Baths and Rooms Company (Limited.) Messrs. Davis and Emanuel, 2, Finsbury-circus, City, architects:—

Contract No. 2, for Engineers' Work.

		Alternative estimate.
Rigg, Chester	£2576 12 7	£2626 12 7
Phipson, London	2080 12 0	———
Bacon and Co., London	1978 0 0	2118 0 0
Truss, London	1945 0 0	———
Jennings, London	1725 0 0	1725 0 0
Topham and Co., High Wycombe	1640 6 8	1690 6 8
Jukes, Coulson, Stokes, and Co., London	1607 0 0	———
Gimson and Co., Leicester	1428 0 0	———
Grant, Landport	1028 0 0	1228 0 0

TAUNTON.—For alterations and additions to the Baptist Chapel, Silver-street, Taunton. Mr. James H. Smith, architect:—

Aplin	£840
Dinham and Manning	736
Giles	698

COMPETITION.

INDIA OFFICE.—A competitive examination for forty appointments in the engineer establishment of the Public Works Department in India, will be held in July. W. J. Thornton, secretary.

CONTRACTS OPEN FOR BUILDING ESTIMATES.

PEST, Feb. 7.—For the supply of slates and for covering the roofs of the city slaughterhouses. Herr Julius Hennicke, architect, Berlin, Neue Börse.

BRADFIELD WORKHOUSE, NEAR READING. Feb. 1.—For the supply of good water. J. C. Pinniger, clerk, Newbury.

ISLINGTON, Feb. 1.—For the erection of two spires at S. John's Church. Mr. A. J. C. Scoles, architect, Crofton Lodge, Masbro'-road, Hammersmith.

CROYDON LOCAL BOARD OF HEALTH, Jan. 31.—For the construction of earthenware and brick sewers, in the parish of Croydon, during the ensuing twelve months. R. Cheeswright, Clerk, Town Hall, Croydon.

LLANGWM, near Usk, Feb. 1.—For the erection of school-buildings, at Llangwm. John P. Seddon, Architect, 12, Park-street, Westminster.

LEEDS, Feb. 1.—For building six houses, near Kirkstall-road. Mr. J. Middlewood's, confectioner, 72, Kirkstall-road.

CHICHESTER CATTLE MARKET, Feb. 15.—Contract No. 1.—For the laying out of the site of a cattle market, of about 6 acres in extent; comprising the metalling of the pens, standings, and roads, the construction of the drains, boundary walls, and entrance gates, and the removal and alteration of certain houses

THE BUILDING NEWS.

LONDON, FRIDAY, FEBRUARY 4, 1870.

PROTESTANTISM AND THE CONVENTIONAL CHURCH TYPE*

"The despotism of custom is everywhere the standing hindrance to human advancement, being in unceasing antagonism to that disposition to aim at something better than customary, which is called, according to circumstances, the spirit of liberty, or that of progress or improvement."

MILL ON "LIBERTY."

SUCH a passage as the above naturally comes to the mind after any examination of the Protestant church architecture of the day. And it comes with unusual force when we turn, as now, to the yearly records of Nonconformist church-building. We have before us those of the Congregationalists, Wesleyans, and Baptists. A few of the examples they contain show gratifying signs of improvement. Here and there, as in the Barking Wesleyan Chapel, by Messrs. Pocock, Corfe, and Parker, and as in the Ripponden Congregational Church, by Messrs. Paull and Robinson, there is an amount of careful quiet study which is quite a pleasing surprise in this class of work. We see that the design expresses the facts of the case instead of hiding them, and gains life and interest in consequence. In the former, for instance,—a picturesque little building of Early French Gothic character—the gallery staircase is made a good external feature. The same thing is done at Hungerford and Melbourne Wesleyan chapels, by Messrs. Wilson and Willcox, and deserves praise as a step towards the honest and characteristic treatment of galleried buildings. The Glossop-road Baptist church, Sheffield, by Messrs. Innocent and Brown, has a tower and spire of considerable grace and elegance; perhaps not entirely what could be wished for a tower meant simply to point out from afar the position of a church; but yet less of a sham bell-tower than in many other buildings of the sort. But along with these examples, which exhibit growth and improvement, there are plenty of others of the usual cut and dried mechanical sort. The dead-alive school of architecture is far from extinct yet. There is the regular oblong church with its iron columns, its wiry tracery, and its absurd overdoing of side gablets. There are belfry towers without bells, spires whose sole merit is their height, and an abundance of such ornament as no architect could bear to look at twice. It is, indeed, chiefly in the smaller buildings,—those roofed without columns in one span—that any real design is at present to be traced. In the larger ones, habit and custom, however irrational, still have it all their own way. It is the planning of these larger buildings generally, that we propose in this connection to review. Their decoration—that "sweetening" of spiritless detail which pleases uncultivated tastes and sickens all others—may be left for another time to consider. It is only their general arrangement that space will allow us to notice now.

Thackeray somewhere speaks half regretfully of the time when unlimited toffee seemed to him the highest conceivable gratification in the way of eating, and when such books as "Thaddeus of Warsaw" afforded him like delight as an intellectual treat. There is a trash and toffee stage in architecture as well as other things. At an early period of their art-education people are not fastidious about the quality of ornament, if they can only get plenty of it. And when they see others prefer simple work full of thought and refinement, to elaborate work without them, they are tempted to set down the preference to affectation and the wish to be singular. They can scarcely believe that anyone really likes good bread and cheese better than their favourite sort of sweetstuff. They say, "You praise everything that is plain, you cannot appreciate ornament." Not at all. One's ideal of perfection may all the while be a church as rich as Bourges, or Chartres or Lincoln. It is not that there is any want of relish even for the turtle and venison of architecture, when they are to be had; it is simply that one has reached the stage when it is impossible any longer to dine on cheap confectionary.

Excluding the smallest buildings, then, the bulk of English church architecture has still but one idea. Whether it be Protestant or Catholic, Anglican or Nonconformist, it is nearly all a development or a repetition of a single form. Its style may vary—its artistic merit may be great or small—but its arrangement, with few exceptions, is all based on the same type. The essence of this type is a nave with aisles, in other words, a space for the congregation divided into parallel avenues by rows of columns. In certain cases, indeed, these columns have dwindled down to very slender dimensions, but normally they may be considered as piers of considerable size, numbering five or more in each row.

How this form of church arose out of the Roman basilica, how it was perfected in the middle ages, and how it came to be retained when the ritual of the middle ages was abandoned, concerns the archæologist rather than the architect. For him the question is, "How far does it meet the real wants of the day?" It may be at once conceded that those who follow in the main the religious system of mediæval times are quite consistent in adhering to the regular mediæval church-arrangement. It must be acknowledged too, that of late years they have often connected it with a high class of design. Their architecture is admirable and worthy of general study, but is their arrangement equally so? Is the planning of a Catholic church, in short, the best for non-Catholic ones? Beyond doubt it is imitated in them almost universally, but is this imitation wise?

Suppose, for once, that habit and custom were put out of the question. Suppose it had to be decided for the first time how to build a Protestant church—not one whose type is a temple, and whose purpose is the offering of a sacrifice, but a place meant for the worship of God, and the moral and spiritual improvement of men. The first condition would surely be that all the congregation should see and hear the service: the next that they should do so in a building worthy of its destination. Art is a power as well as a language, and noble impulses come from other things besides words: the problem is to unite them both. The ideal church could never be too elevated in its visible expression, but it could never also be too perfectly fitted for its destined use. Does our conventional church-type, then, fulfil these two requirements? Is it one which would commend itself to minds unbiassed by tradition or precedent? For an answer, examine its results. Look at the churches built in conformity to it, at whatever time and by whatever party. Numbers of them possess excellent architecture, joined to an arrangement which shuts out a multitude of the congregation from the service. Numbers more—a late variation on the type—have a fair amount of convenience, gained at the expense of all that is permanent and elevated. Take the normal Anglican church, with its thick stone columns; there is architecture with imperfect convenience. Take the average Nonconformist church with its thin iron ones; there is convenience with imperfect architecture. But where shall we find the two united? Where is there an arrangement which a competent judgment can approve, clothed in a form which a cultivated taste can admire? The truth is, that on the conventional type the two things are antagonistic. No one designing at first hand a hall in which a few hundred people should listen to a speaker would begin by putting a dozen columns down the middle of it. And when custom and the popular notion that "it would not be a church without" insist on the insertion of these columns, a regard for the practical uses of the church insists, on the other hand, that they shall be as small as possible. Unfortunately they cannot be much reduced with impunity. The muscle and sinew of the building,—its life and force and expression, grow feebler as its main supports grow less—and as the nave-piers waste away, the whole structure falls into a sort of architectural consumption. There is a perpetual struggle on this system between the necessities of architecture, which call for large columns, and the necessities of arrangement, which demand small ones, and the best examples of it only show a compromise where neither are satisfied.

Setting aside small churches roofed in one span, there are now in use, then, two main varieties of that type of church which habit and custom have made the almost universal one amongst us. Both have a nave and aisles divided by numerous columns, but in one variety these columns are massive and of stone, while in the other they are thin and usually of iron. Speaking generally, the former are those of the Church of England, and the latter those of Nonconformists. Exceptions may, of course, be found on both sides. St. Paul's, Haggerstone, and St. Mark's, Notting-hill, for example, have iron columns, while Scarborough, Tynemouth, Grantham, and various other Congregational churches have stone ones. And here and there, in the works especially of several leading Gothic architects, wide departures from the conventional type may be found—churches with narrow side aisles, with very few columns, or even with no columns at all. But on the whole, English Protestant churches in the 19th century are built on much the same plan as English Catholic ones in the 13th, and of their two chief varieties, one copies the Catholic arrangement to the letter, while the other merely makes its columns of iron instead of stone. We will notice the stone-column variety first.

In this variety, as everyone knows, and as the hundreds of churches built of late years on the system clearly prove, a large part of the congregation are practically shut out from the service by the columns. Nearly half the side aisles are thus rendered useless, perhaps worse than useless, since they are filled with seats from which people can neither see nor hear. It is quite true that a "magnificent profusion of space" may be made a great element in architectural effect. A church is not to be condemned because every square foot of it is not available for congregational use. But where it is attempted to make every part so available, every part should be free from obstruction. There is no principle which binds the designer to a niggardly economy of area any more than of height. But there is a plain principle which should bind him, if he is providing for a service in which the worshippers are intelligently to join, not to arrange his church so that the service becomes invisible or inaudible to any of them. And the extent to which, on the conventional arrangement, it does become so, may be seen at a glance where the sittings are free and the congregation large. Everyone, for instance, who has attended the services in the nave of Westminster Abbey must have noticed the way in which the side aisles are avoided as long as a single seat can be obtained elsewhere. If he has himself been unfortunate enough to be placed in them, he will be convinced, too, that this avoidance is not without good cause. The obstruction in this case, indeed, as in most cathedrals and abbey churches, is worse in proportion to the size than in a smaller building. It increases rapidly with the number of the piers. A comparison of the space obscured by the nave piers in a number of English examples, taking, for the sake of comparison, the pulpit

*The Congregational Year Book, 1870. Hodder and Stoughton.
The 15th Annual Report of the Wesleyan Chapel Committee, 1869.
The Baptist Handbook, 1870. Yates and Alexander.

as the point which ought to be visible, makes this fact quite clear. Where, as for instance at S. James the Less, Garden-street, there are only three bays in length, the area thus obscured is only some 14 per cent. of the whole area of the nave. Where, as at S. Andrew's, Hillingdon, there are five bays, it rises (in spite of the smallness of the piers), to 25 per cent. With six bays, and a more massive style of construction, about 32 per cent. of the nave is obscured in the new Cathedral of S. Finn Barr, Cork, while in some of our old cathedrals, such as Lichfield, not less than 42 per cent. of the nave would thus be rendered useless. On the average, however, it may be assumed without exaggeration that one-fourth of the nave space in large modern churches (of the stone-column variety) is thus blocked up by the columns. Making all allowance for passages to the seats, it will generally be found that in a congregation of 600 persons, at least a hundred are thus placed where they can neither see nor hear the greater part of the service. Worse cases might be pointed out, but this seems a fair computation. Now with this result, which anyone can verify for himself, is it reasonable to go on perpetuating this variety of conventional church type for Protestant worship? Does it argue a high standard of architectural ability that every time we try to accommodate 600 people, we should put at least 100 of them in places quite unfit for their use?

(*To be continued.*)

NORTHERN TIMBER.

IT may, perhaps, be considered by philanthropists and negrophilists, that there is a considerable portion of selfishness in the tacit reception of a verdict, which transmits to posterity the labour of providing for their own fuel, but in plain truth, each generation has its own duties to fulfil; its own enterprises to carry out; its own difficulties to overcome, and its own rewards to earn. A glance at the manner in which we treat the works of our ancestors will demonstrate that instead of preservation at the hands of succeeding generations, demolition is the fate that awaits them. Were we, as a nation, to remain *in statu quo*, and, similarly to the Chinese, to have our page of progress represented by a blank, then it would answer to build for posterity, and gauge the exigences and wants of future ages by our own. But so long as progress, enlightenment, and advancement are ineradicably fixed in the European mind as the necessary duties of a nation, it is absurd to think for a moment of the possible or probable state of society after the lapse of six centuries. We may safely and wisely leave to bees, birds, oxen, and sheep the fulfilment of the maxim enunciated in the well-known lines of Virgil commencing "*Sic vos non vobis.*"

It may not be within the knowledge of our readers that nearly a century ago, fears were entertained that our stock of English oak was declining with alarming rapidity. These anticipations were subsequently fully realised. The enormous demand made upon the Sussex and other plantations by the Royal Navy, for the use of which a large quantity of timber was especially set apart and solely appropriated, had of later years caused a diminution in the number of trees that it was hopeless to attempt to repair. A Commission was appointed to make an accurate survey of the forests available for supplying oak and other timber for shipbuilding, and their report was confirmatory of the anticipated exhaustion of the once extensive supply. Fortunately, although our own forestial resources were consumed, those of other countries were abundant, and, in many instances, almost intact. The introduction also of iron as an important element in the shipbuilding trade, prevented any serious grounds of apprehension on the score of not being able to provide a sufficient number of vessels to maintain the supremacy of our flag, and to waft our merchandise to the ports of distant shores. The reply to the question, How is the gradual exhaustion of forests both at home and abroad to be prevented? will be probably surmised to be, for every tree cut down, let another be planted. This is the course actually adopted in many instances, but it is only a prolongation of the natural supply. It is impossible to grow trees in the same proportion as they are cut down. Consider the number of years before any tree suitable for even ornamental, much less, constructive, purposes, is fit to be used. In a word, the supply cannot possibly be made to keep pace with the demand, and the discrepancy is yearly increasing. As one source becomes *épuisé*, the others are drawn upon more heavily, and so the drain proceeds, until there is none left. It is unnecessary to remark that the major portion of all timber used throughout Europe is exported from the semi-frozen regions of the Baltic and Northern seas. So greatly, has the demand upon these sources increased of late years, that the Governments of Russia, Sweden, and Norway have been compelled to take the matter under serious consideration, and to consent to the felling of timber in forests which hitherto have been untouched. This preservation of their contents is, however, not due to any absolute desire to retain them in that condition, but to the fact that they are situated so far inland, and so destitute of all means of communication with the seaboard, that they remained unapproached until the exhaustion of more available supplies, compelled the timber merchants to assail them. The red and the white pine are the two principal varieties of timber which reach our coast from the north, and the introduction of machinery for not merely roughly cutting them up, but for planing, moulding, mortising, tenoning, rebating, and performing all the more finished work formerly performed by hand labour, has imparted a stimulus to the trade which it will never lose. Our readers have already seen in the columns of The Building News, what has been stated respecting the importation of *finished* woodwork from the Baltic ports, for the new building on the south bank of the Thames. Recently large establishments have been opened on the French ports of Dieppe, Fécamp, and Havre for the express purpose of cutting up and finishing the pine timber imported from the North. Whether it is cheaper to import it in the log and afterwards cut it up at home, or to receive it in the finished form required for immediate use, is a question every nation must decide for itself. Local circumstances, the state of local trade, the price of labour, and the description of woodwork wanted, are the best guides in the matter.

The oldest of the establishments to which we have alluded, was charged with the preparation of the pinewood houses which were erected as temporary residencies along the route of the Suez Canal. Many of them were highly ornamented with mouldings and beadings, and constituted excellent specimens of what the carpenter's and joiner's art is capable of, in this smooth and docile description of wood.

From the heavy calls made upon the Northern timber by England, France, Germany, Holland, and other countries, it has been found impossible any longer to saw by hand labour. The introduction of machine-sawing is almost universal, the motive power being sometimes steam, but more frequently water, as abundant supplies of the latter agent are usually in the vicinity of the forests, and a little rude engineering will speedily convert them into useful motors. When it is borne in mind what a splendid trade is done by the Baltic ports, it is no wonder that Prussia and other Continental powers are anxious to obtain them at almost any price. Prussia exports a large quantity of oak planks and staves for the use of the cooper. For timber of excessive dimensions, the North, capacious as are its stores, is surpassed by the gigantic products of the forests of the New World, although the resources of the latter are not taxed to the same extent as those of the former. This follows naturally enough from the greater proximity of the former to the countries where the export trade is chiefly conducted. Iron, both cast and wrought, is now employed by preference in numerous instances where wood alone was used. In future years, there is no question but that the increasing scarcity of timber will cause iron to be used by necessity in situations, and for purposes for which it is apparently now not at all adapted. There is no truer maxim than "Necessity is the mother of invention." The Americans have long since proved this by the scarcity of their hand labour driving them to the invention of machinery and mechanical appliances for effecting operations previously performed by the former agency. Without taking into account the resources of the New World, there is a sufficient stock of timber in the old to last, not quite so long, perhaps, as our coal fields, but at any rate for another century or two.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE usual fortnightly meeting on Monday evening last was presided over by Mr. Edward I'Anson, Vice-President. Messrs. A. H. Paget and A. W. Tanner having been elected as Associates, and several donations and additions to the library announced,

Mr. J. D. Crace, Contributing Visitor, proceeded to read a paper

ON THE ORNAMENTAL FEATURES OF ARABIC ARCHITECTURE IN EGYPT AND SYRIA.

Mr. Crace, after giving some historical particulars of the earliest and most important of the Arab monuments in Cairo, proceeded to describe a few of the leading types of the structures themselves. They may be classed as follows—Mosques, sebeels, gates, khans, and dwellings. The mosques vary greatly in plan and decoration. The sebeels, or drinking fountains, are very numerous in Cairo, and are among the most striking of its buildings. They are most frequently situated at the corners of streets. Below is a single closed chamber, lighted by one or more large metal grilles, sometimes simple, sometimes very ornamental. Within is the water supply, with which a tube communicates, and, terminating in a small brass pipe or nozzle, allows the wayfarer to quench his thirst by suction, for the water is rarely allowed to run to waste. The upper story of these buildings is almost always a school. There is generally a wide eave or verandah of wood projecting some feet from the wall to give additional shade to those who choose to rest by the way. The interior roofs are often richly panelled, and decorated elaborately in colour and gilding. The gates being considered important not only for defence but for ceremony, are in some instances works of considerable grandeur. One curious feature of almost all the Saracenic gates of Syrian towns is that the thoroughfares in ever direct, but usually takes a rectangular turn. This does not apply, however, to the Cairo gates. The khans consist usually of an open court, surrounded by small chambers or recesses, and have generally also an upper story. In the country, or by the roadside, they afford shelter and security for man and beast. They have frequently very handsome doorways. Round the open or enclosed court is an arcade or series of recesses to be used as shops, with a stone divan running in front of them. A wide eave or awning affords shade if the court be open. The famous khan of Assad Pascha, at Damascus, is entirely roofed in by domes, and has a fountain in the centre; a gallery runs round it, and doors open from this, as well as from the ground, into a series of apartments which are let as shops or offices. The residences or private houses of Cairo are of every variety of general plan, most of the better class having an open court, into which the reception rooms open. The rooms of the harem are generally on the first floor, and some of these are very handsome. Mr. Crace next described, with some minuteness, a few of the principal dwelling houses of Cairo and Damascus, noting the various points in which the buildings of the one city differ from those of the other. In the course of this portion of his paper, he stated that the windows of the first

floor are protected at Cairo by the beautiful *mushrebeeyeh*, and those in Damascus by a more simple trellis.

There are several distinctions between the Arab domestic architecture of Egypt and that of Syria, as represented at Damascus. Of the latter, it may be said that it is more Persian. Moreover, here the same general style and plan of house continues to be built to this day, although the details become very debased and corrupt. At Cairo, Arab architecture may be said to be extinct, the modern style of ornamentation being entirely derived from Europe and Turkey.

In proceeding to describe the manner in which the various parts of Arabian buildings are ornamented, the author said that the dome, the prominent feature of many buildings, especially of those devoted to sacred uses, varies in form, but almost always has the pointed arch for its section. In the neighbourhood of Cairo it springs usually from a straight stilt. At Alexandria, however, and at Rosetta, it has occasionally the curve returned at the base. In Egypt, the external surface of the dome is almost always decorated—sometimes by being vertically moulded, sometimes by the surface being moulded in a succession of bold chevrons; but in many instances in Cairo and its neighbourhood, intricate geometrical patterns are worked over the whole surface, whilst arabesques or scrolls, carved in a lower plane, enrich the ground between. The group of buildings known as the Tombs of the Caliphs includes many splendid examples of dome decoration. A broad band or frieze, usually of writing, is carried round the base of the dome, and the broad splay or "weathering," by which the structure rises from the square to the octagon, is frequently very boldly moulded. The dome is generally surmounted by a bronze turned finial, carrying the crescent.

Even more characteristic than the dome is the minaret of the Arabian mosque. Minarets vary much in form and ornamentation. In plan, the octagon is the most frequent form in the minarets of Egypt; but they are also sometimes square; sometimes circular. In the earlier mosques, the minarets are shorter and more simple than in those of the fourteenth and fifteenth centuries. It is these latter which may be taken as examples of the minarets of Cairo; to this period belong the most perfect examples. Starting from the square base, they are splayed into the octagon or circular plan. If octagon, the sides are sometimes panelled or arcaded in the lower story. The structure is then corbelled out (usually, but not always, with the honey-comb work) sufficiently to allow of a balcony or gallery running round. The next story, of less diameter, will sometimes be panelled with mouldings geometrically arranged, or occasionally, as in one at Damascus (Jama Mallah), with bands of a different coloured material, or with inlaid devices. Where octagonal in the lower stories, the upper story is generally round, as in the beautiful minaret of Kaitbai. Some have the upper story open, the superstructure being carried by single or grouped columns. If coloured materials are used in the exterior of the rest of the building, they are generally used also in the minaret, either in bands, or ornamentally. The minarets of Cairo are terminated variously. Many are surmounted by a terminal in the form of an inverted pear; others have a sort of domical summit. The Syrian minarets are more frequently square in plan, are less elaborate in form, and have fewer storys and less sculpture. Some of the square minarets of Syria strongly remind one of the early Italian campaniles.

Arabian buildings (the minarets excepted) have rarely much exterior cornice. The Mosque of Sultan Hassan, at Cairo, has a heavier cornice than usual, of bold, honeycomb pattern. Interior cornices are more used. An ornamental crenellation or parapet, however, is frequently used. These are often shaped on the reversible principle—*i.e.*, the ornamental form is such as to correspond with the reversed form of the interval.

It is in the walls of the larger buildings, that is to say, in the treatment of the large masses, that we may perhaps find most to learn from Arabian architects. Most dignified and simple are they, preserving great breadth without unsightly plainness or heaviness. The Arabian builders have admirably adjusted their wall surfaces to their climate. All their surface ornament is so subordinated as not to break up the masses, which are usually so arranged as to preserve the effect of height. The Mosque of Sultan Hassan is a notable example of this; but there is hardly one among the finer mosques which does not display this characteristic. The upper and lower window openings are usually grouped into bays slightly recessed, a wide frieze being carried through and continued between them. Koran inscriptions usually form these friezes. Alternate courses of stone, of two or more colours, are of very frequent use, both for exterior and interior. Being used horizontally, their tendency is to give size and width—a tendency the excess of which is skilfully counteracted in the recessing of the windows, as already mentioned; and still more so by the high doorways. Large plain surfaces are often relieved by panels, either of sculpture in low relief, or inlaid ornament of variously-coloured materials.

The external doorways of the principal mosques derive immense grandeur and dignity from the bold way in which they are set within a deep recess of great height—frequently nearly the full height of the building. Fine instances of this arrangement are the world-renowned doorway of the Mosque of Sultan Hassan, and those of the Moäiud and Kaitbai mosques. The door itself is usually, in the case of public buildings, richly decorated, generally with plates of bronze, elaborately wrought in the geometric devices so familiar in Arabic and Moorish work. The doors of private houses are much simpler. Those at Cairo are most frequently set in a pointed or segmental arch, are plain match-boarded, and then ornamented in colour with a painted device or frame. The doors of private houses in Damascus, however, differ entirely from those at Cairo. There the door head is generally segmental, and the wooden door itself has an outer ornamentally-cut frame, under which the planks, placed straight or diagonally, are nailed to the stronger back-framing in such a way that the nail heads form part of a geometrical pattern drawn from nail to nail.

The window openings in the upper stories of the mosques are usually small single openings, with pointed heads. Where of large size, they are often filled with pierced geometric tracery of stone or cement, or, occasionally, of wood. The lower windows have sometimes square, sometimes segmental, heads. The ground-floor windows of mosques or sebeels have usually a wooden frame or architrave, with carved surface ornament, in which is a grille or trellis, more or less ornamental, of either bronze, iron, or wood. Other window openings have pointed heads, with light shafts in the reveals; or, again, the same are double, with a light centre shaft, and with their arches cusped. Rosette and star-shaped openings are also used, some of the former splaying outwards from a small circular opening, the cusps followed out in the splay. First among the windows of ordinary dwelling-houses comes the beautiful *mushrebeeyeh*, before referred to, and to which Cairo and the Arab quarters of other Egyptian towns owe so much of their picturesque beauty. These are projecting bays or oriels of wooden lattice, of every variety of pattern, and of lace-like delicacy. These lattices are most ingeniously constructed, the parts being first delicately turned and then fitted together in a geometrical network. Some, again, are altogether simpler, being formed of flat laths half lapped into each other, and often notched with great ingenuity, so as to make the lattice ornamental. The *mushrebeeyehs* vary greatly in size and form. The largest are usually square in plan, and are divided into four, five, or six bays in length. The lower part has enclosed panels, with some ornamental arrangement of mouldings on the surface. Above these are the trellis or lattice panels, and at the top are not unfrequently small squares of coloured glass, set in pierced ornament of plaster. The whole is crowned by a projecting canopy, with bratishing of wood prettily shaped. The *mushrebeeyeh* is oftentimes carried on stone corbels or wooden trusses, in which case the soffit is formed into a decorative ceiling. From these handsomer specimens, the *mushrebeeyeh* dwindles down to its probable prototype, the little projecting cupboard of lattice-work, octagonal in plan, but just large enough to hold the family *ghoôleb*, or porous jar, in which the water cools as the air passes through the surrounding trellis, for *mushrebeeyeh* signifies "the place for drink." Windows of this description are to be found in Jerusalem and southern Syria, but not frequently.

Of exterior features, the author reserved to the last the mention of the column and the arch. The former is (in the older works, at least), wherever possible, borrowed, capital and all, from more ancient buildings, whether Egyptian, Roman, or Christian. As in the existing Roman basilicæ, columns of odd lengths are frequently used, and the height, where defective, made up for by an impost or abacus, or by lowering the superimposed structure to meet it. One peculiar feature in connection with the column in Arabic buildings is the almost invariable use of a wooden cushion between the capital and that which it carries. This is usually formed by two layers placed in opposite directions, each consisting of from three to five pieces of wood 3in. or 4in. thick, and the necessary length. In the case of a continuous arcade, wooden tie bars extend from the centre of the cushion to the next column. Some allege that this arrangement is a provision against earthquakes, but whatever its purpose, the practice seems to have been very general. The arch in the Arabic, as in every other, style, is a very distinctive feature. The forms of arch most favoured are the pointed and the segmental, the latter usually rather flat. The round horseshoe arch of Moorish architecture is seldom met with in Egypt or Syria, although the pointed arch has frequently the slight return at the springing which is so conspicuous in the true horseshoe. The simple semi-circular arch is, however, met with, as in the example of the gateway to the khan at Cairo, the ornamental treatment of which reminds one forcibly of Norman work, than which it is much later. In examples of the best periods of Arabian architecture, the treatment of the stones of the archivolt is very distinctive, and this is especially the case with the segmental arch. The stones are, in this latter form of arch, almost invariably notched together, often with the most ingenious designs, in such a way as to produce a counterchanged ornament on the face of the archivolt. This is generally made to appear constructive, although, in fact, it is not always so, but is occasionally produced by a thin layer of veneer on the surface. In larger arches, such as gateways, and also where a straight lintel is required, a plain single or double setback or notch is used, merely as an additional security in construction. Had the great centre stone of the lintel at Baalbec been thus keyed, it could not have slipped into the critical position which it now occupies. This construction and its ornamental treatment is as general in Damascus and throughout the Arab buildings of Syria as in Egypt.

Mr. Crace, after giving some further particulars of the exterior work of Arab buildings, proceeded to speak of the decorative treatment adopted in the interiors. He said that the same use of alternately coloured courses which is noticed in the exteriors, is often frequently extended to the interiors; and even where they are not built in coloured material, the imitation is carried out in red and white, or black and white colours. This may be seen not only in the mosques and other large buildings of Egypt, but in the courts and rooms of the private houses both of Cairo and Damascus. At the latter place there is scarcely a court of any large house but presents an example of this system, more or less consistently carried out, while the great khan of Assad Pascha in the same city, although a modern and scarcely an Arab structure, is a good example of the principle carried out to its fullest extent. (Date 1742 A.D.) After noticing the manner in which the interiors of cupolas are most generally decorated, and giving at some length the details of that of the Kubbet el Fedaweeyeh, Mr. Crace said that all flat ceilings whether of mosques or other public buildings, or private houses, are treated without distinction in one of two or three ways. The handsomest, producing the richest effect, is the beam and panel arrangement, which seems to have prevailed largely in mosque, sebeel, or dwelling. The finest examples are to be met with in the Moäiud, Mahmoudie and Kaidbai mosques, in some of the older sebeels, and in the house of the Skeikh of the Mufti at Ebn et Sadäd. A simpler kind of ceiling is that formed by beam and match-boarding. Here the boarding is probably placed diagonally, and the narrow boards are painted successively in various colours, with perhaps a running pattern of conventional flower ornament or arabesque on each, the beam being elaborately decorated. Geometrical patterns are extensively used in the decoration of buildings of all kinds, externally and internally. Wherever there is a frieze in an Arabic building, whether externally or internally, it is always in writing. How beautifully the Arabic character lends itself to ornamental purposes is well known. Probably in no other

style of art has writing been so largely used for this end. The same use of writing extends to every object in which Arabic ornamental art is expended; witness their metal vessels, which are frequently entirely covered with inscriptions. The practice doubtless owes its origin in the preclusion of the representation of animal life, the instinct of the artist to appeal in some direct way to the understanding and sympathy of the beholder being too natural and too strong to be altogether repressed. After referring to other branches of Arab decorative art, the author came to speak of the interior ornamental woodwork of the Arabs. Wood as a constructive material was always scarce in the region influenced by Arabic architecture, and a climate of extreme dryness and temperatures makes the use of that material in large masses undesirable. Probably, from this cause, all Arabic woodwork is made up of a number of small parts—framing and panels ingeniously wrought into every variety of rectilineal form of design. Doors, panels, window shutters, cupboards, all are made after this fashion, and no two seem to be alike. To this system of woodwork may be traced that wonderful variety of geometric design applied to all materials by the Arabs. (Specimens of this woodwork were exhibited.) The author concluded his paper (which was very fully illustrated by coloured sketches) by saying that almost every example he had quoted was a portion of a ruin, or was shortly doomed to ruin by those sure destroyers, neglect, apathy, and selfishness. Monuments worthy of world-wide fame are dropping to pieces, either from utter disregard or by dishonesty, or by the mildew of a fatalism which never repairs. Inquiring once of the Imám, or chief priest of the mosque, why, since a devout man had built so beautiful a structure to the glory of God, no good man was found to keep it in repair, Mr. Crace received this reply:—"Truly, he was a good man who built this place for the worship of God; but it now belongs to God, and, if He wills it so, it will surely crumble and fall. It is as He wills!"

A short discussion followed, in which Sir Digby Wyatt, Mr. Burges, Professor Kerr, and Mr. Phené Spiers took part, and the thanks of the meeting having been tendered to the author of the paper, the Chairman announced that a special meeting of members only would be held on Monday evening next, and the proceedings terminated.

STREET CLEANSING.

AT a recent meeting of the St. George's, Hanover-square, Committee of Works, Mr. Tomkins, surveyor, presented a report on the cleansing of streets, in which he stated that Smith's patent horse-sweeper had been in use in the parish for eight days. The first cost was £26 15s.; each set of brushes costs £2 10s. The cost of work was estimated as follows:—For machine, including grease, oil, and wear and tear, 1s. 6d.; one horse and driver, 9s.; brushes, 2s.; two men to clean crossings (2s. 8d. each), 5s. 4d. per day; total, 17s. 10d. The work accomplished is equal to that of forty paupers, the machine having cleansed Park-lane in little more than two hours; a gang of twenty men requiring 4½ hours, at a cost, including foremen's wages, wear and tear of brooms, &c., of £5 3s. 8d., or about six times as much as the former, and representing a saving in labour done of £4 5s. 10d. per day. The advantages of the machine are:—The saving of expense in cleansing. The service would be performed by horse labour, and the road repairs would proceed without interruption. To these must be added the very important saving in the wear and tear of the roads by keeping them in a more cleanly condition, affording an opportunity of drying quickly, their durability being thereby greatly increased. Mr. Tomkins, in concluding his report, expresses a desire to see these machines multiplied, and says he feels strongly that it is nothing short of extravagance under the guise of economy, to allow any street of considerable traffic to lie for even one day under the combined effects of traffic and slop.

PROPOSED PUBLIC BATHS IN S. LUKE'S.—It having been proposed to construct a number of dwelling-houses on the site of the celebrated and extensive bath known as Peerless Pool, at the rear of S. Luke's Madhouse, the Vestry of that parish has now under consideration a proposal for erecting public baths and wash-houses on the site. Such would be a great acquisition to the people of this crowded and poverty-stricken neighbourhood.

Furniture & Decoration.

THE THEORY AND PRACTICE OF MODERN HOUSE PAINTING AND DECORATION EXPLAINED IN A SERIES OF PRACTICAL ARTICLES, WITH SOME REMARKS ON THE PRESENT STATE AND PROSPECTS OF DECORATIVE ART.

BY AN EXPERIENCED WORKMAN.

AT the present time, when so many of our notables in various parts of the country are distributing prizes and ventilating their ideas on art matters, it may not be out of place if something is said on the subject from a workman's point of view. Any person who has given much thought to the subject will be impressed with the wide-spread ignorance that prevails as to the knowledge of the simplest principles which should govern the application of ornament and colour to the embellishment of dwelling-houses. We cannot wonder at this when we consider how little has been done to spread amongst us that knowledge. How many thousands of even educated people are there who are absolutely ignorant of the merest rudiments, not willingly nor necessarily so, but simply because they have not been taught, nor have they had before them true and good examples to educate the eye and form the taste. Is there any valid reason why this ignorance should continue—is there any reason why this knowledge should not be as wide spread as our educational means will allow, until it comes to be acknowledged as a part and parcel of an ordinary English education? We can see no reason why it should not be so; we are, as a people, capable of being taught what is pure and true in decorative art—that art which contributes so much to our domestic pleasures and comfort, and which in its nature tends to elevate and purify, making home bright and beautiful, as all English homes should be. My own experience has in many instances proved that there is ever in the commonest minds a capability of appreciating the true and the beautiful in form and colour. I have seen, again and again, that the educated and ignorant have been alike pleased with works of art which in themselves were true in taste: with this difference, that the educated mind could give a reason why, and the ignorant was pleased without knowing why; and yet the latter could experience a pure and unusual pleasure from something it could not comprehend, which fact goes far to prove that there is an innate love of the beautiful planted in our hearts by Him who created nothing in vain, and who in His great bounty to man has spread around him everywhere on the face of the earth, in the depths of the sea, in the starry realms of space, and throughout all the universe, so many perfect examples of beautiful form and most brilliant combinations of colour—so many wonders of construction and adaptation, that the mind is bewildered by their number and perfection. How wide a field is thus placed at our disposal for study, for example, and for adaptation to our own use! Nature is the truest and best teacher. However much we may improve, whatever progress we may make, we must return again to her inexhaustible storehouse for information, for inspiration, and for new material to supply our wants There is no false teaching with her. How many of the simplest flowers that bloom are in themselves examples of beauty, of form, and exquisite purity of colour! The stalk, the leaf, the flower, the grass, the tree, the shrub, the climbing plant, the weed, even the lowly moss that gathers on the old walls, or clings to the crumbling tower, and which colours with its beautiful tints the rocky hill sides, are all so many lessons of untold value to us if we know how to use them aright. Art, in its infancy and in its best and most perfect state, is alike in this respect—that it relies upon natural forms for its sustenance. How clearly this is shown in the earliest examples of decorative art of which we have any record. Let us take, for example, the Egyptian: how simple in form, and yet how pure and perfect in adaptation, conventionalised only so far as to adapt it to the purpose required, yet retaining sufficient resemblance to its type to indicate the growing plant, the straight stalk, or stem, and perfect flower from which the crafty Nile dweller drew his inspiration. He not only crowned his shaft or column with leaves and flowers, but he added to its already beautiful form a well-considered and judicious selection of colours—a lesson taught him by the natural objects surrounding him in such prolific luxuriance. He thus formed for himself a style of decoration peculiarly adapted to his requirements, and admirably suited to the nature of the climate of the land of his birth, a style of decoration pure and simple, and yet so true that an eminent authority has said of it that the Egyptian, although the oldest, is, in all that is requisite to constitute a true style, the most perfect, and that all other styles approach perfection only the nearer they approach the Egyptian. This being true, what a commentary it affords upon our boasted progress! Thousands of years ago a people lived who were capable of originating and bringing to perfection a style of decoration so well suited to their wants and purposes, and so true in its adaptation and execution, that we, in this nineteenth century, may still turn back and study their works, and find it profitable to do so. Above all, the lessons they teach us—the one great fact to which they point and lead the way—are still available to us as to the ancient Egyptian. We have still the same glorious book open to us from which he drew his instruction; still may we consult its widespread pages, ever open to us without restriction and without price, available alike to the poor and the rich, never failing, always new. Do we desire a design for a wall decoration, for a muslin curtain, or for a lace veil, for works in silver and gold, for works in brass and iron, or for carving in stone or marble, Dame Nature will supply us. Do we want lessons in harmonious colouring, where can we see such combinations of colour as we see in nature? and the best of it is that she never makes any mistakes in placing colours in juxtaposition with each other; in all she does she blends them harmoniously together. I remember with pleasure some thirty years ago being employed in the neighbourhood of a rather extensive heath or common, which was covered with a luxuriant growth of the common fern. The time was autumn. I shall never forget how beautiful was the effect produced by the varying tints of the ferns, as they were waved about in graceful undulations by the wind; but my delight increased tenfold when plucking a leaf—if I may so term it—and examining the fronds, which, commencing at the extreme point of the leaf with the brightest yellow, descended through all the gradations of yellow, yellow and red, red and green, and so on through all the varying mixtures of red, green, and blue, culminating in the richest purple: a beautiful example of exquisite harmony of colour, a lesson to be thought of always with pleasure, a delight never to be forgotten. How little we know of the wondrous beauty spread broadcast over the face of the earth within reach of the poorest of God's creatures! And because it is so cheap and so plentiful that we have but to stretch forth our hand to pluck its beauty, we are only too apt to despise and neglect it, as we do many other great blessings. If those who have not felt the pleasure which may be derived from studying the treasures contained in some of our old English country lanes, could only once realise it, it would open a new world to them. Days may be pleasantly and profitably spent in some of them when the hedge-rows are brilliant with the beautiful wild rose honeysuckle, when the hedge-banks are one mass of the richest vege-

tation, amongst which are some of the most beautiful forms of leaf and flower and creeping plant, many of them weeds, 'tis true, but none the less beautiful for all that, a collection of which is not only a reminiscence of a pure pleasure enjoyed, but they form a wonderfully rich store for reference and for for suggestion of design. These considerations lead us inevitably to one conclusion, viz., that the study of nature is the only true guide to the practical knowledge of the true and beautiful in form and colour.

Nature attains her ends, whether of construction or decoration, by the simplest means, and with the least expenditure of material; whereas the tendency of modern ornamental art is to strain at effects by a profuse use of combinations of ornament, and an overcrowding of parts. We are like a people who have been long oppressed by a tyrannical government, the moment we throw off the yoke of whitewash and its attendant ugliness, the reaction is so great that we rush into the other extreme, and bedaub every inch of available space with meritricious ornament, as if pure art consisted in mere elaboration of form; we seem to strive which shall originate or rather multiply the greatest amount of ugliness, forgetting the great truth that the simplest forms are the most beautiful. If we gather the choicest flowers, and most exquisite plant forms—if we then throw them in a heap on the ground, what are they? Nothing but a heap of sweltering vegetation; but if we take them separately, and examine them, what a world of beauty will be revealed to us. Each separate plant or flower is an endless source of study and profit in itself. So it is with decorative forms; overcrowding not only destroys that beauty, but it wearies the brain, and confuses the eye, and is destructive of all repose, which is an essential and indispensable qualification of all successful works. Some little time ago I had an opportunity of inspecting a sample of this abortive style of decoration. The house was a middle-class mansion with the usual complement of reception rooms, with a good hall and staircase. The hall floor was laid with Minton's tiles of good design and quite appropriate, the columns and pilasters and skirting, or plinth, were done in imitation marble. Above the skirting a dado was formed, with a tile pattern stencilled upon it, with a border, of course, the walls above which had also a diaper stencilled upon them, the cornice (an elaborately enriched one) picked out with gold and colour, the ceiling divided into panels and covered with ornament, above which was a dome-light filled with ornamented glass. On entering the dining-room I was at once impressed with the quantity of ornament used. Walls covered with a pattern of raised flock, painted and picked out with gold and colour, ceiling decorated, of course, doors and window lining ornamented with low tone colours, with gold heads; drawing-room carried out with the same profuse use of ornament; walls thrown into panels with gold mouldings, and arabesque pilasters painted in the florid German style; woodwork got up in white varnished enamel, with gold beads and ornament. Still the same style and profusion of ornament pervaded the other rooms wherever ornament could be put. There it was; no repose, no rest for the weary eye and brain; no feeling of relief from the general sense of oppression. There could be no fault found with the execution of the work as a whole, but everywhere throughout the whole place was evidence of an utter absence of good taste and feeling for true art; in fact, it might be characterised as ornament run mad. It was a relief to me to get away from it, with the consoling thought that I had not to live in such a house; and yet this work was carried out by an eminent firm of upholsterers and decorators.

The houses in Grant-road, Battersea, will shortly be re-numbered.

Building Materials and Appliances.

LIME-BURNING.—II.

IN my former article I discussed some of the principal forms of kilns used for the preparation of tunnel lime. In alluding to my notice of Hoffmann's patent a correspondent of THE BUILDING NEWS, Mr. Bapull, points out some facts in which his experience differs from my statements. I must congratulate him upon having apparently escaped some of the difficultles which I know must invariably accompany the use of any process which differs from the ordinary methods of manufacture, and from which it stands to reason that no patent, however good, can be exempt. When I spoke of the number of men required, I had no wish to make out that a disproportionate number of men were engaged, but that, as will be seen by the context, the kiln could *only* be successfully employed by manufacturers in a large way of business with a steady demand for lime all the year round. While on my defence, I may be allowed to assure "A Contractor" that I have no dread of the exhaustion of the lias formation, and that, when speaking of the manufacture of an artificial lias, I had only in view the possibility of so far improving the pure or fat limes of this country as to render them capable of competing with those possessing hydraulic properties, which I think I am justified in stating to be the only limes which can really be relied upon. All our experience so far goes to prove the utter worthlessness of pure limes, and Sir C. Pasley's opinion on the subject is so well expressed that I cannot do better than quote it:—"I consider chalk lime bad under all circumstances, even in the driest situations, as it never attains any great degree of adhesiveness, even when only exposed to the atmosphere, and its resistance is so insignificant that it rather drives than sets in air. All that can be said in favour of chalk lime mortar is, that it is better than none, and that walls built with it will not fall to pieces in process of time, as General Treussart asserted, without external violence;" and summing up, in conclusion, he says:—"Thus chalk lime mortar, when wet, is a pulp or paste, and, when dry, it is little better than dust."

I should perhaps notice, before passing on to flare-kilns, the so-called bottle-kilns used for the manufacture of cement, but I will reserve my remarks upon cement manufacture for a separate article. Flare-kilns may for the purpose of consideration be divided in the same way as tunnel-kilns, and the result of flare-burning may be arranged under the same head as I selected in my previous article. Flare-kilns are, for the reasons which I have already pointed out, much less prevalent than tunnel kilns, but in the neighbourhood of London—that is, in the chalk districts of Surrey, Sussex, and Kent, this form of burning is very frequently resorted to in order to produce a clean, bright-coloured lime. The simplest form of flare-kiln is a cylindrical or cup-shaped chamber, which may or may not be roofed in with a dome or cover. The bottom of this chamber is formed of fire-bars, and doors or openings immediately above and below these bars afford the means for feeding and stoking the fires. In filling the kiln with stone, hard, sound lumps are selected and rudely built together in the form of an arch over these bars, allowing a space of some fifteen or twenty inches for the fire, if coal is the fuel employed, or two feet and more if the fuel is turf or brushwood. On the top of this arch the stone is piled up in such a way that the larger blocks or lumps occupy the centre of the kiln, while the smaller ones fill up the interstices round them. In this manner the kiln is gradually filled until the layers of stone may be ten, fifteen, or, even in large kilns, twenty feet in thickness. For filling and emptying, a door is usually left in the side, which is bricked up when the kiln is full, the last portion of the stone being sometimes filled in through a hole in the dome or cover. The firing of a kiln filled in the way I have just described is an operation requiring considerable care and skill. If the fires are forced or "driven" too rapidly, the chalk voussoirs are liable to fly to pieces, and on this account the temperature must be very steadily raised. Again, the loss sustained by the stone of its water and carbonic acid during the process of calcination diminishes it materially in bulk, and sometimes causes the arches to contract to such an extent that the voussoirs give way, and the whole contents of the kiln then collapse into the fires and put an end to the process. In examining the working of this kind of flare-kiln according to my former plan, we find, under the first head, that the entire quantity of stone contained therein is continuously exposed to the action of the fire. If the proportions of the kiln are so arranged that the height is exactly such as, combined with the draught, to enable the flame to traverse the entire thickness of the stone and to reach the upper layers at a sufficiently high temperature to effect their calcination, the waste of fuel is comparatively unimportant. But these conditions are rarely fulfilled in a kiln of this kind, and a large portion of the heat is lost on account of insufficient height. We must not forget, however, that the portion of the stone nearest the fires must be traversed by the flames before they reach the upper part of the kiln, and that therefore, practically, the lower part of the kiln must be considerably more burnt than the upper, and the higher the kiln the more heat has to be driven through the lower regions of the stone. Another consideration to which due attention is not commonly paid is the tendency of the flames to form chimneys or short cuts through the lime, and in this way sometimes (especially in windy weather) to avoid large portions of the kiln and overburn others. This is occasionally the result of carelessness in filling the kiln, but it seems in some cases almost inevitable. Colonel Scott has proposed, in order to remedy this, that divisions or brattishings, if I may so call them, should be formed in the contents of the kiln by means of thin partitions of lime dust. Where the top is uncovered, fresh openings for the flames may be made by cautiously thrusting in a crowbar. Under the second head, namely, the mode of emptying and filling, we get the usual disadvantages of an intermittent kiln. The arches require skilled labour, as I must still call it, but the building up of the stone throughout the remainder of the kiln requires, perhaps, less attention and care than the filling of a tunnel kiln. The amount of fuel varies so much in different districts that it is difficult to fix upon any proportion by which to arrive at a conclusion, but we may assume it to be from 20 to 30 per cent. of the weight of the stone. Under the fourth head, namely, the wear and tear, I can claim a slight advantage for flare-kilns over tunnel-kilns. At first sight it would appear that, owing to the absence of fuel in the kiln itself, the walls ought to last much longer in flare-kilns, as the greatest wear in a tunnel-kiln takes place, as I have already stated, at that part where the fuel first gets into violent ignition, but it must be remembered that the heat of a tunnel-kiln is in most cases considerably less than that generated in a flare-kiln, and this excessive heat almost invariably forces out the walls and causes rents and cracks. In the words of a practical lime-burner, "You may do what you will, but they will bust."

In respect of quality, flare lime has, at any rate in London, the advantage of a much readier sale than any other, from reasons I have already explained. The presence of core can almost invariably be detected by an experienced burner, and in flare-kilns which make much slack burnt lime the men know tolerably accurately where to look for it. A well-managed flare-kiln may take a high position in

respect of the quality of the resultant lime. Lastly, with reference to the facilities for working, we have to look at the extra charge of attending to and stoking the fires ; the loading I have noticed and the emptying or drawing is much the same as in tunnel-kilns, except that from having the bottom occupied by bars, the drawholes are not so conveniently disposed as in most tunnel-kilns, but there is no particular reason why flare-kilns should err in this respect, except that tradition has decided that the door should be some way up the side, and that the kiln should be emptied through the door. My notice of the commonest form of flare-kilns has already consumed nearly all my space, and I must postpone part of my account of other descriptions of kilns for another time. In order to make flare-kilns into continuous or draw-kilns, it becomes necessary so to contrive the fire-places that while they are capable of acting upon the whole mass of stone, they may not interfere with it during the period of its descent. The various methods of accomplishing this have formed the subjects of constant patents, none of which seem up to the present time to have come in for much share of public favour. It would be hopeless for me to attempt to describe more than one or two of the plans which have thus been proposed, but before going into the question in detail, I may point out a few general facts. Ever since the days of the ingenious Count Rumford, there has always been a tendency to endeavour to construct running flare-kilns, which by reason of their *great height*, should make the utmost use of the flames and heat of the fuel. As I explained in the earlier part of the present article, as long as we have sufficiently large fires and a sufficiently powerful draught, we may go on increasing the height of the column of lime to any extent. Now it will readily be understood that in a running kiln, even if the limit to which the flames can reach be exceeded, as the lime is drawn out at the bottom, the upper portions of the stone will gradually come under the action of the fire, and if the height be very much more than that to which the flame can reach the top of the kiln will practically be a receptable in which the stone may undergo a thorough warming and drying before it reaches the flame in the hotter part of the kiln. This is excellent in theory, and as long as the height of the column of raw stone does not destroy the draught from the fires into the kiln it would be all very well in practice but for one unfortunate drawback which has stood in the way of so many inventors, namely, that in the long descent down this shaft you are liable to two very serious inconveniences. The first is that if the stone is such as to produce a soft lime it becomes terribly crumbled during its long descent, and you get from 15 to 20 per cent. of lime-dust ; and, secondly, that you are more or less liable to get the contents of the kiln set fast, and to find that no amount of persuasion will induce the stone to come down, and be drawn out. That both these objections, however, may be, and have been, successfully overcome, I am quite well aware ; indeed, thousands of tons of lime are burnt annually on the Continent and in America in kilns of this form. Having thus prepared the way for my account of running flare-kilns, I will in my next article endeavour to give the leading features, and to analyse the working of a few of the kilns on this principle which have come under my notice.

GILBERT R. REDGRAVE.

VAUXHALL BRIDGE.—The rumour lately circulated to the effect that the Metropolitan Board of Works was about to purchase Vauxhall Bridge, and to free it of toll, is contradicted. An act, however, was obtained last session, enabling the City of London and the Metropolitan Board together, to use the coal and wine duties for one year (after the main-drainage term) to purchase bridges.

COTTAGE BUILDINGS, WALTON MANOR OXFORD.

THESE cottages are being built on land belonging to S. John's College, Oxford, let on lease for a term of 99 years. The site forms a portion of the ground which was intended for the artisans' houses in connection with the Great Western Works, at the time of the negotiation for the establishment of these works in Oxford. The facework of the cottages is built with red and white nine-inch brickwork, as indicated by the elevations, and with half timber framing filled in wholly with red bricks in cement. The roofs are covered with Staffordshire brindle tiles, and red ridge tiles. The side lights of bay-windows and the shop windows are filled with lead quarry work, and all other windows provided with wood casements opening outwards. The cottages throughout are constructed with cheap but sound and durable materials ; they serve as an illustration of the effect which may be obtained even in economical buildings by a judicious arrangement of such materials. The cost of each building, except that with shop attached, is about £140, and the rent of each will be from £13 to £14 per annum. The builder is Mr. J. Walter, of S. Giles' Terrace, Oxford ; and the architect, Mr. Clapton C. Rolfe, of Oxford.

PROPOSED NEW ROUTE TO IRELAND.

THE project is once more revived of making Fishguard, in Wales, a port of departure for Ireland, and thus effect an important saving in the distance to the principal districts of the sister isle, also shortening the sea voyage. When Mr. Brunel first laid out his plans for the South Wales line, it was his intention (says a correspondent) to make Fishguard the Irish Channel terminus ; but circumstances arose which rendered it desirable to alter his plans, and Milford was ultimately selected as the most convenient port. Since that time many efforts have been made to carry out Mr. Brunel's original intention, but hitherto the necessary capital has not been forthcoming. There is a prospect, however, that before long the project will be again revived in earnest, with a fair probability of its being successfully carried out. At a meeting of the Waterford and Wexford Railway Company, the surveyors of the new line of railway from Ballygeary Bay to Wexford were instructed to make final surveys, with a view of closing the agreement between them and the company for the making of the line. This course has been taken upon the sanction of the Public Loan Commissioners to a loan of £75,000 being granted to the company for the purpose of constructing a harbour at Ballygeary. It is intended by the company to run a line of packets from Ballygeary Harbour to Fishguard, and, by means of rail and packet, to establish a short sea route between London and the southern and western parts of Ireland. At Fishguard it is probable that a pier will be constructed. From Fishguard to Clarbeston-road, a station on the Great Western Railway, the distance is only seven to eight miles, and as there are no engineering difficulties to contend with, a branch line could be made at a comparatively cheap cost.

ARCHÆOLGICAL.

EXCAVATIONS AT S. MARTIN'S-LE-GRAND.—The latter end of last week, the workmen employed in sinking a trench for the Pneumatic Tube in S. Martin's-le-Grand, at the corner of the Post Office nearest to Newgate-street, came upon the remains of a solid wall, some feet in thickness, composed of several courses of rough stones and bricks filled up with rubble. They supposed it to be the old London Wall, but upon examination it is thought to be part of the wall of the College of S. Martin-le-Grand. This ancient monastic establishment was founded by Ingelric, A. D. 1060, who subsequently became the first Dean. The building is described by the *Athenæum* as a fair large college of a dean and secular canons or priests. Their rights were not only confirmed by William the Conqueror, but their possessions increased. The succeeding monarchs also favoured them. The office of dean was filled by men who were notable ecclesiastics, many being exalted to the bench of bishops. The rights of sanctuary were also enjoyed by this precinct as early as 1376, the 50th of Edward the Third. The church, with all rights and possessions, was given by Henry the Seventh, July 19th, 1503, to the Abbey of Westminster. The abbots of the abbey assumed the office of dean, and all power passed to Westminster. The college and property were seized by order of Edward the Sixth, in 1542, and pulled down, several streets being built, viz., George-street, Angel-street, Little and Great Dean-court, Three Crown-court, &c., the inhabitants having the peculiar power of voting for Parliamentary Members for Westminster ; but the Act of Parliament for building the present Post Office, 55 George 3, c. 91, passed June the 23rd, 1815, abolished this right and removed the whole of the inhabitants.

COMPETITIONS.

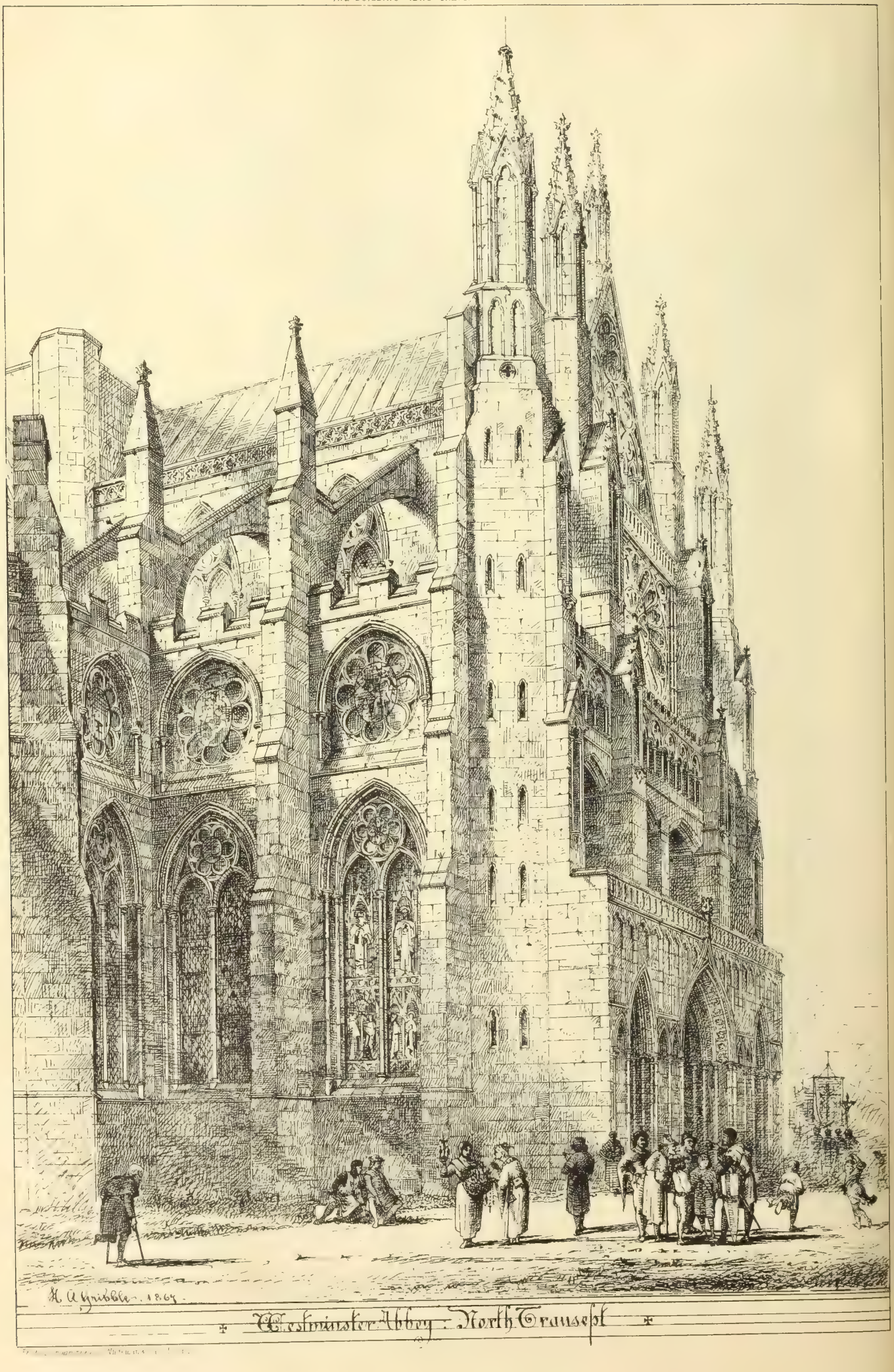
LAMBETH WORKHOUSE.—LIMITED COMPETITION.—A correspondent says :—"Some time since premiums were awarded for complete designs for infirmary and ground plan of workhouse, for which refer to your own pages. The guardians have since decided not to erect the infirmary, but to build a new workhouse, and to convert the present workhouse buildings to infirmary uses. They therefore instituted another competition for complete designs for a new workhouse, the plans for which were sent in to the old workhouse at Lambeth, 21st Jan. 1870. The following architects were invited to compete—Andrew Wilson, East India Avenue ; H. Jarvis, 29, Trinity-square, Southwark ; T. E. Knightley, Cannon-street ; Mr. Lee, Basinghall-street ; Beeston, Son, and Brereton, Victoria-street ; F. Marrable, Whitehall-place ; F. H. Fowler, 32, Fleet-street ; C. Foulsham, 28, Craven-street ; Stenning and Lepard, 157, Fenchurch-street ; J. Crawley, 23, Thavies Inn ; R. E. Tyler, Buckingham-street ; Searle and Son, 4, Bloomsbury-place ; Luck and Rushforth, Regent-street ; Mc Murdie, York-road ; Newman and Hewitt, Mortimer-street ; R. Parris, Kennington-road ; Arthur and C. Harston, East India Dock-road. I do not know how many of them have responded to the invitation."

NEW CHURCH, BEXLEY HEATH, KENT.—We are glad to learn that Mr. Burgess' selection has been adopted by the Committee of the above. The work is to be carried out by Mr. Knight, of Nottingham, who was placed first by the referee, Mr. T. C. Knightley and Mr. Blackburne, of London, being second and third respectively.

KIDDERMINSTER SCHOOL OF ART.

THE distribution of prizes to the successful students of the Kidderminster School of Art took place in the Music Hall in that town, on Friday last. The total number of students who had attended the school during the past year was 77, a decrease of 7 on the previous year. The decrease had been in the numbers attending the evening class, and principally among the designers, who had not availed themselves of the advantages offered by the evening class during the last five months, the attendance falling from 56 in the first quarter to 26 in the last. In order to estimate the position the Kidderminster school held relatively to other art schools, it should be observed that but five other schools, out of 120, obtained gold medals at the national competition. The Kidderminster school had obtained one gold medal, two bronze medals, seven third grade prizes, and four second grade prizes. Five students had received free studentships. The master (Mr. Kennedy) had been awarded a bonus of £20 by the Department, and attention was drawn to the circumstance that, out of the drawings of thirty-six students submitted for competition, the works of thirty-five were pronounced satisfactory ; and payments in respect to them were made by the Science and Art Department.

S. THOMAS'S HOSPITAL.—A recent number of the *Times* contained a letter signed "F.R.C.S.," complaining of a breach of contract in the time for opening the new S. Thomas's Hospital. The contractors undertook that two pavilions, the resident medical officers' quarters, and the buildings for the medical school should be completed by Michaelmas, 1869 ; and the remainder of the buildings by Lady Day, 1870. The writer complains that from the present state of the building there seems little prospect that it will be opened before the end of the present year. In the meantime, the interests of the poor suffer, and the unfinished and unroofed buildings are being injured by weather.

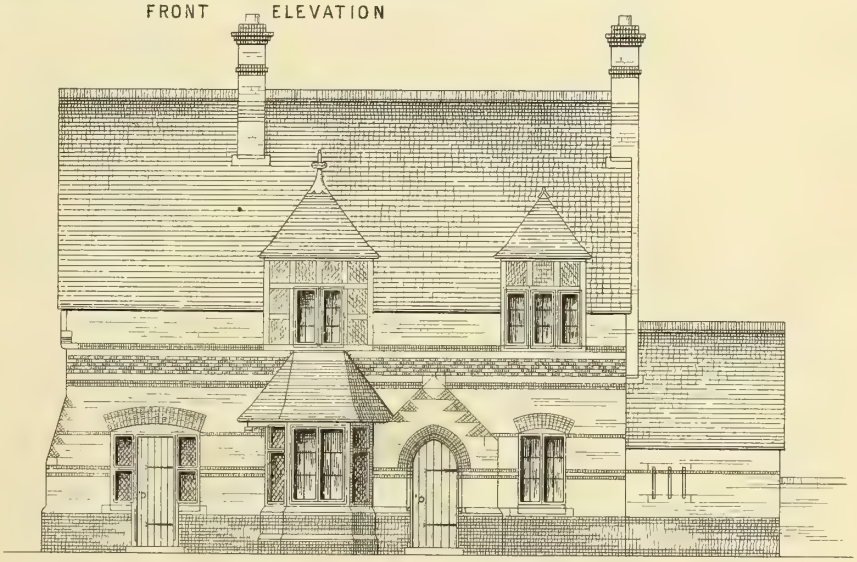


H. A. Gribble. 1864.

Westminster Abbey.—North Transept.

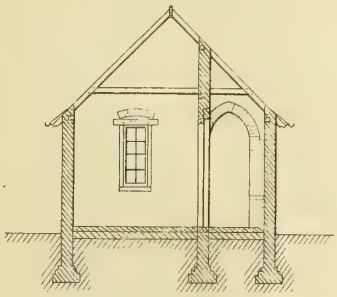


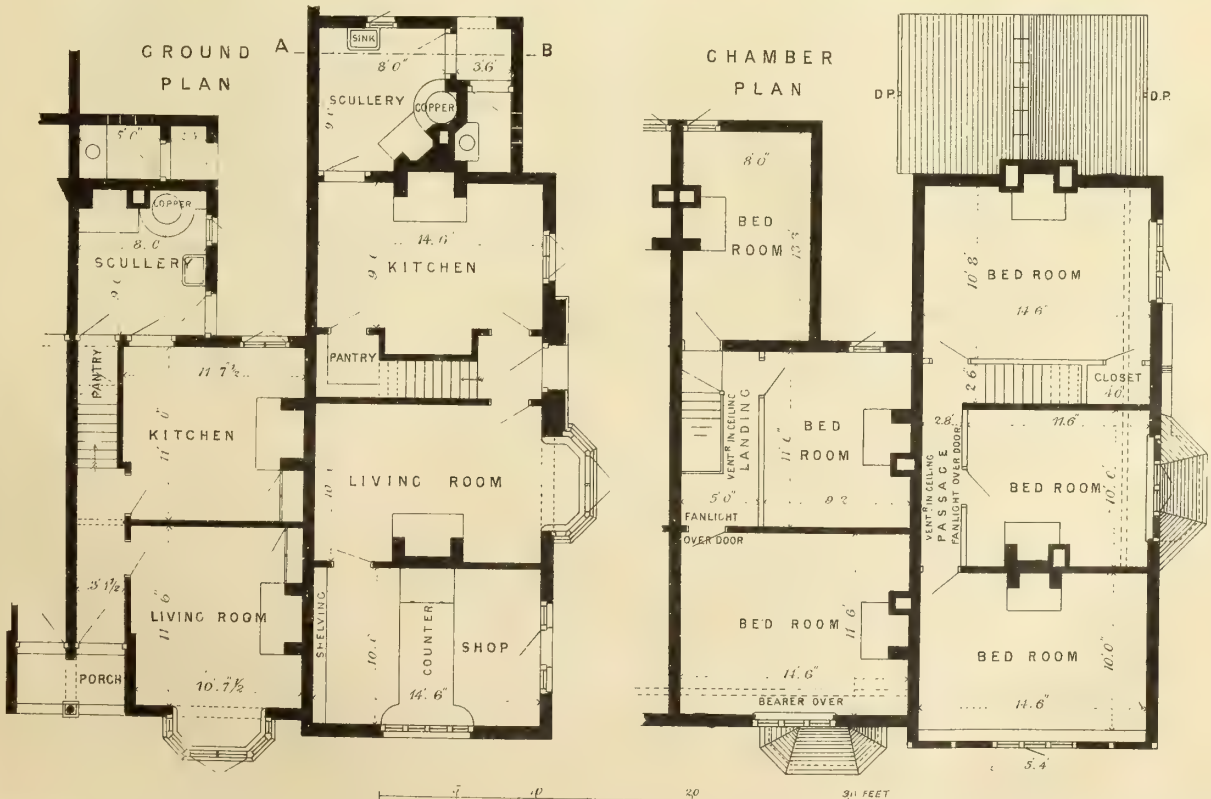
FRONT ELEVATION



SIDE ELEVATION

SECTION AT A.B



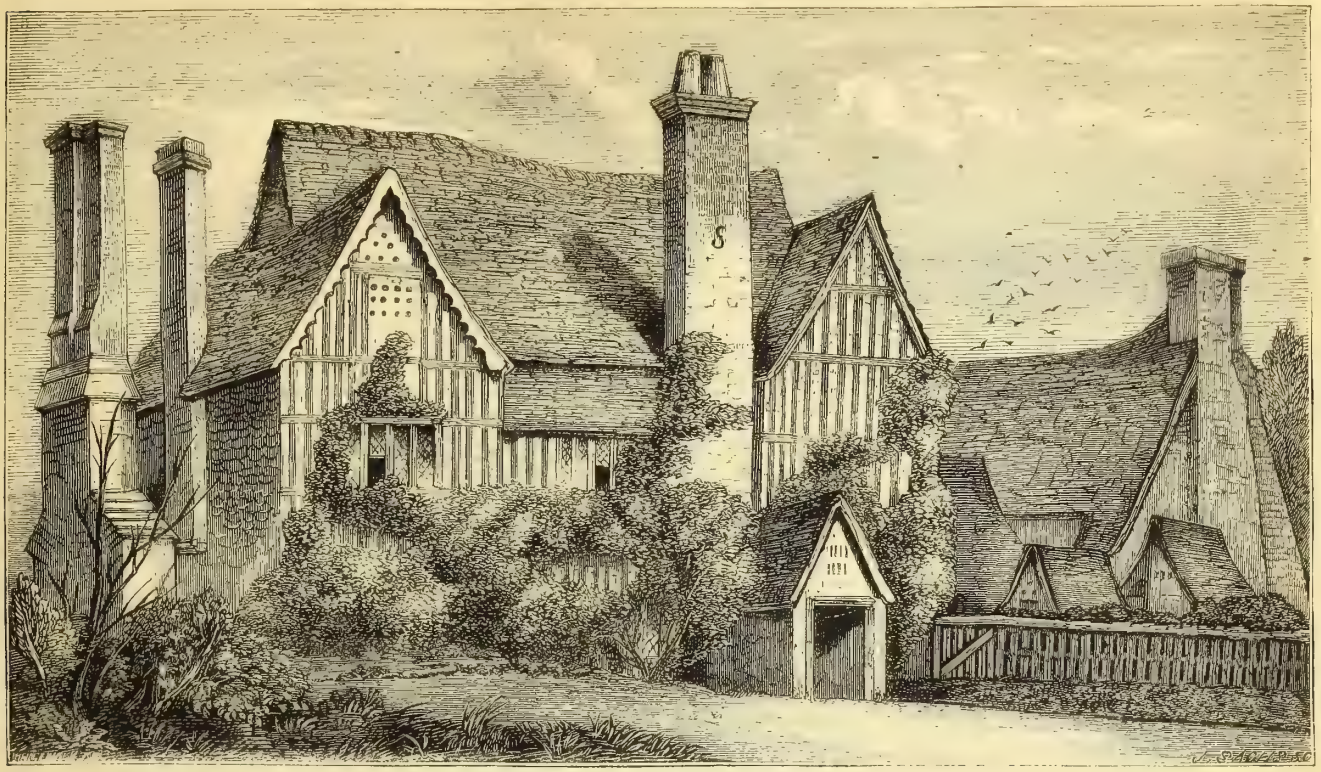


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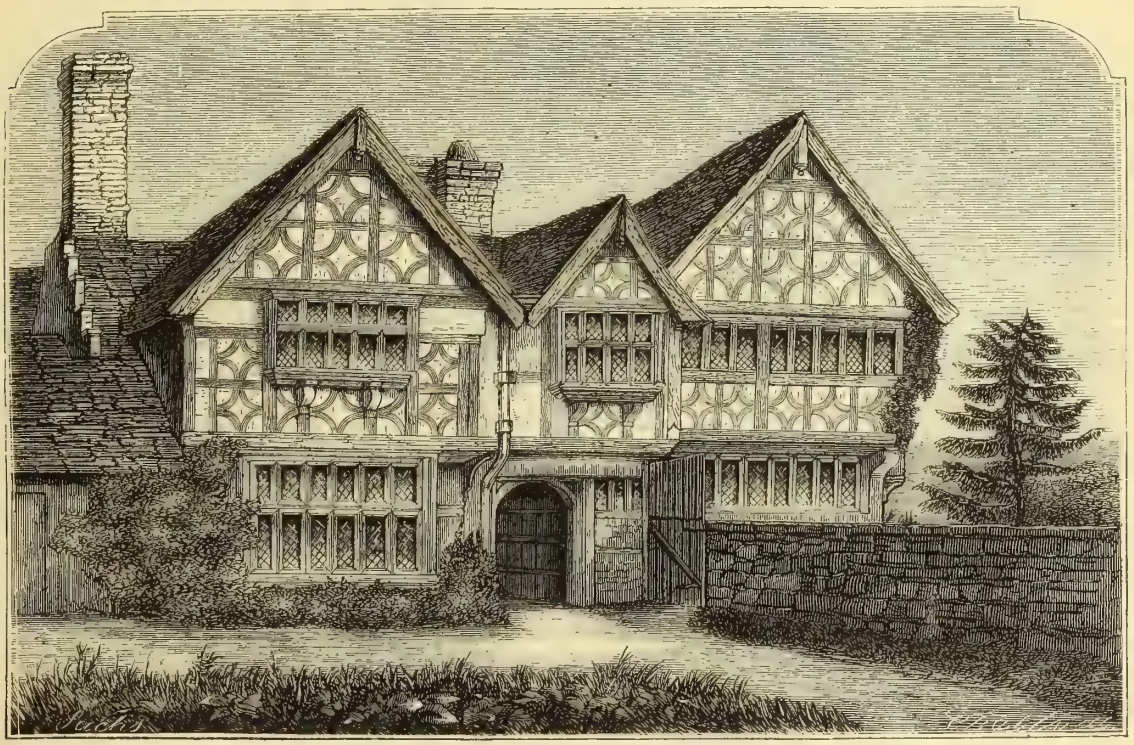
COTTAGE BUILDINGS, WALTON MANOR, OXFORD.

CLAPTON C. ROLFE, A.R.I.B.A. OXFORD.

TIMBER BUILDINGS OF THE MIDDLE AGES.—(See page 97.)



CROWHURST PLACE, GARDEN FRONT.



GREAT TANGLEY MANOR, SURREY.

ARCHITECTURAL ASSOCIATION.

AT the last ordinary fortnightly meeting, held on Friday evening last, Mr. Lacy W. Ridge, President, occupied the chair; and the following gentlemen were elected members:—Messrs. J. L. Stuart, E. M. Sheldon, D. North, A. H. D. Colley, T. E. Hudsman, W. Scott, and C. M. Stedman.

Mr. QUILTER read a letter from Colonel Scott, referring to the International Exhibition of 1871. It appears that the subject had previously been before the Committee of the Association, and the secretaries had been instructed to forward one or two recommendations and inquiries to the Commissioners for the Exhibition. The letter now read informed the Committee of the Association that it was part of the Commissioners' scheme of annual exhibitions that an exhibition of architecture, as well as the other fine arts, should be held each year. The Commissioners had not yet considered the question of the juries on architectural matters. [The question is, whether the juries on architecture shall be formed of professional men or not.]

The CHAIRMAN said the communication just read from Colonel Scott was worthy of very serious consideration by the profession. If there was to be an annual architectural exhibition at Kensington, of course the question would arise "Is there room for another Architectural Exhibition elsewhere?"

It was announced that the first of the Association's visits to works in progress this session, would take place to-morrow (Saturday) afternoon, the building selected being the new Inner Temple Hall, by permission of Mr. Sydney Smirke, the architect. (For further particulars see our advertisement columns.)

The REV. R. C. NELSON, of Walpole S. Peter's, Wisbeach, then read a paper entitled,

NOTES ON THE CHURCHES OF THE DEANERIES OF FREEBRIDGE LYNN AND FREEBRIDGE MARSHLAND, NORFOLK.

Mr. NELSON said that the district in question was one which ought certainly to be "done" by the student of architecture. The two deaneries are as different as places so nearly adjacent can possibly be. The centre point is the town of Lynn, and the buildings to which attention is directed in these "Notes" are all within a radius of twelve miles from that point. The difference alluded to is this:—the scenery of Freebridge Lynn is pretty, quiet, thoroughly English, cheerful and bright. The churches, though good for the most part, are chiefly of historical interest. Freebridge Marshland, on the contrary, is flat and dreary, but the churches, although of no note in local history or legends, are magnificent structures, and stamp the country in which they are situated with a character peculiarly its own. The

churches in the town of Lynn are six in number —S. Margaret's, S. Nicholas's, S. James's, All Saint's, S. Peter's, and S. John's. Of these, the first named is the principal ecclesiastical edifice in the town, and though it has suffered deplorably from the ravages of the genus "Goth," it is still a noble pile. The plan is that of a large and stately collegiate church—nave with aisles, two towers at the west end, central lantern, north and south transepts, choir with aisles. The founder was Bishop Herbert, of Norwich. Adjacent to the south-west tower was the charnel-house of S. John the Evangelist, demolished in 1802 for the erection of "a meat market, surmounted by a commodious billiard room"(!) The south-west tower is Norman, the opposite one being Perpendicular. The spire, 258ft. high, fell down in 1741, and crushed the old nave, which was rebuilt in the nondescript style of the period. After giving further particulars of this church, Mr. Nelson stated that when, some years ago, it was required to widen the street, instead of pulling down the houses on the opposite side, an entire bay of the Chapel of the Holy Trinity, in the north aisle, was removed. S. Nicholas's Church, or rather chapel-of-ease, is the largest chapel-of-ease in the kingdom. It was founded *circa* 1200, and the Early English tower remains. With this exception, the chapel was rebuilt about 1432, in the Perpendicular style. It remained intact, as far as walls and windows go, till, within the past few years, it was "restored." All Saints Church once stood in the country, but the town has encroached on the fields and completely surrounded it. The style is Perpendicular. Of S. James's Church, there are few remains. It has seen great vicissitudes—first a church (at the Reformation desecrated), then a manufactory for poplins, then a poor-house (the spinning-house, it was called), then the Union workhouse for the borough of King's Lynn. In 1855 the lantern fell down. The present ruins are occupied by the County Court, a steam-engine factory, and a Primitive Methodist chapel. S. Peter's, West Lynn, is a quiet village church on the opposite side of the river. The modern church of S. John the Evangelist was erected from designs by Mr. Salvin in 1846. After noticing the monastic and military remains in the town, and also the domestic and municipal buildings of mediæval times, Mr. Nelson referred to an unique ecclesiastical building known as the "Red Mount" (supposed to be a corruption of Rood Mount, from a large rood or crucifix placed above the higher chapel). It is a small octagonal structure, consisting of two chapels, an under and an upper one—the former being the older, the upper the more modern and elaborate. t is supposed to have been a kind of halfway house for pilgrims going to Walsingham from the Midland Counties. The design and workmanship is the same as that of King's College Chapel, Cambridge, and most probably was executed by the same workmen. The old stained glass windows have been wantonly destroyed during the ast three years.

Passing on to Castle Rising, once a seaport, the Anglo-Saxon church, the Norman castle, the Norman parish church, the Hospital of the Holy Trinity, and the Market Cross were noticed in succession. Respecting the three first-named, it seems that the Norman Baron, William d'Albini, when he erected his stronghold here by grant from William Rufus, not only wanted the site upon which the Saxon church stood, but found the church much too small for the increase of population caused by the influx of his retainers and dependants. The earthworks were thrown up, the old Saxon church buried, and the Castle erected, on the completion of which, or simultaneously with its erection, the present stately Norman parish church was built, from designs, in all probability, by the same architect. The Anglo-Saxon church, like other buildings of the same date, was plain and small. The entire length from east to west is 76ft. 8in. The walls of the nave are 3ft. 2in. in thickness, and those of the chancel 3ft. 7½in. The church consists of a nave; a square compartment (it is difficult to say whether the lower basement of a central tower or not); a chancel and sacrarium, terminated by a semi-circular apse—a very rare feature in Anglo-Saxon work. After describing the Castle, Mr. Nelson came to the Norman church, dedicted to S. Lawrence, and consisting of nave, central tower, chancel, south transept, chapel, and vestry. The chancel is Transtitional. The dimensions are: nave, 62ft. 4in. by 23ft. 9in; tower, 18ft. by 18ft. 4in.; chancel, 25ft., by 18ft. 10in.

The churches on the Royal estate of Sandringham were next noticed. They are: S. Peter's, Wolferton, erected about 1486, on the site of an earlier one destroyed by fire; S. Mary Magdalene, Sandringham, recently restored; S. Felix, Babingley, consisting of nave, south aisle, porch, and western tower (the chancel is in ruins, the walls covered with ivy, and there are remains of a fine piscina); S. Peter and S. Paul, West Newton, a late Perpendicular structure; and S. Mary's, Appleton, which is in ruins. It consists of west tower, nave, porch, aisles, and chancel; the tower is circular and very early. A walk of two miles across the fields from the Prince's estate brings the tourist to Flitcham, where are the remains of what must once have been a very fine church. There are a nave, south aisle, south porch, tower (once a central one) south transept, and chancel in ruins.

Mr. Nelson next proceeded to take his audience in imagination along the banks of the Nar, a tributary of the Ouse. This small stream is noticeable from the fact that no less than six religious houses stood on its banks during its course of twenty miles. Starting from Lynn, the first monastic institution encountered was that of the White Friars; the next was the Nunnery at Blackborough; four miles further up are the remains of another religious foundation at Pentney—and here is something worth hunting out. It is the venerable abbey gateway, in a wondrous state of preservation, and still retaining the original oak doors, which are of the most massive kind. Still farther on, at the village of Narborough, are some traces of the Roman occupation. Continuing to ascend the stream, the village of West Acre is reached. Here once stood a large abbey, of which there yet remain considerable traces. The abbey gateway is nearly perfect, and stands by the side of the churchyard wall. The parish church has been dreadfully mutilated since the Reformation. Higher up the Nar is South Acre, an interesting fane; and beyond this are the majestic ruins of Castle Acre, the largest of the Acres. The village of Castle Acre reminds one of a Continental town rather than of an English agricultural village, partly from the military and ecclesiastical remains, and partly from the materials of which most of the houses are built. The Abbey and Castle have been used as stone quarries, and corbels, shafts, caps, &c., appear in the most incongruous situations. The Castle stands upon ancient British earthworks, and there is a fine old gateway of flint at one end of the principal street of the village. The monastic remains are wonderfully perfect. The parish church, dedicated to S. James the Apostle, is large and handsome, affording specimens of Early English, Decorated, and Perpendicular work. It consists of nave, chancel, north and south aisles, north porch, and a lofty and handsome tower at the west end. The interior is remarkable for the elegance and loftiness of its proportions. A mile higher up the Nar is the little church of Newton, which contains some Anglo-Saxon work in the upper story of the tower.

Turning to the Deanery of Freebridge Marshland, Mr. Nelson said it was almost impossible to over-rate the grandeur or the beauty of its churches, or sufficiently to admire the spirit in which wealth was lavished upon them in order to make them very patterns and models of parochial churches. Starting from Wisbeach to walk to Lynn, the churches which are passed on that journey of fourteen miles are Walsoken, West Walton, Walpole S. Peter's, Walpole S. Andrew's, Terrington S. Clement's, and Tilney All Saints. Of these, Walsoken, dedicated to All Saints, is an imposing pile, consisting of an Early English western tower and stone spire, a nave and chancel, each with aisles of the purest and most perfect Norman work, and a south porch of Perpendicular work. Two miles further on is the fine church of West Walton, the prevailing style of which is Early English, with some exquisite detail. The church consists of nave with aisles, a shallow south porch of exquisite design, a chancel and north aisles, and a stately detached tower about 60 yards from the main building, which serves the purpose of a lych-gate. The church of Walpole S. Peter's is perhaps the most magnificent of all the Marshland churches. In plan, it comprises a western tower in the Decorated style, nave with aisles, chancel, and north and south porches. There is also a most peculiar feature, viz., a roadway under the east end, which gives the altar a magnificent elevation. The roof of this curious roadway or passage is elaborately groined. The whole work, with the exception of the tower, is Perpendicular, the nave and aisles being of an earlier type than the chancel. The nave is extremely long. The church of Walpole S. Andrew is a very fine one of Late Perpendicular work, but it is dwarfed by its nearness to S. Peter's. The church of Terrington S. Clement's is of large dimensions, and although it lacks the high finish and beautiful detail of Walton and Walpole S. Peter's, it has a stateliness which is very striking. It is of Late Perpendicular workmanship, but seems to have been hurriedly and imperfectly finished, in consequence of the Reformation. It remains, as it was left by the mediæval workmen, a magnificent shell, a mighty, but incomplete idea. It comprises nave with aisles, south porch, choir, north and south transepts, an unfinished central lantern, side chapel, and a fine detached tower. At a distance of two and a half miles from Terrington stands the beautiful and interesting church of Tilney All Saints, which has been carefully restored. The tower and spire are Early English at the base, and Decorated in the upper stage. The nave is very stately, and has five Norman and two Early English arches on each side, opening into side chapels. A curious feature of the church is, that the roofs of nave and chancel are both on one level. A walk of about one mile will bring the pedestrian to the Clenchwarton Station, and in a few minutes he will be back again at Lynn. Mr. Nelson concluded an unusually long and interesting paper (of which the foregoing is the merest abstract, as he entered into the principal details of most of the churches named, externally and internally, including screens, sedilia, fonts, &c.) by suggesting the eligibility of the district as the *locale* of a sketching tour during the annual vacation.

Some discussion ensued, and a vote of thanks to the rev. lecturer concluded the proceedings.

TIMBER TRADE OF 1869.

THE business during the past year has been uneventful and remarkable for its freedom from excitement, and on the whole may be considered as having been satisfactory to most of those engaged therein. The aggregate import has been less than for many years past, and the wood trade of Liverpool, instead of progressing, has actually decreased the past few years, and the consumption has been less than in the preceding six years. The chief cause of this we consider to be the disproportionate rates of carriages ruling from here to the manufacturing districts as compared with other ports, which the railway companies appear to foster and favour more than this, enabling our competitors on the east coast to supply many of the larger manufacturing towns, which, on account of their situation, would certainly otherwise derive their supplies from this market. This, combined with the substitution of iron for wood, where practicable, has curtailed our trade. Heretofore, the chief article of wood to this port has been pine timber, but the supply of this is rapidly falling off through the increased prices in Canada, consequent upon the great demand for the States; and our consumers have latterly directed their attention more to pitch pine, Baltic timber, and sawn lumber, which can be obtained at much cheaper rates. In fact, our trade appears to be partly changing, for whilst in 1859 the import of colonial woods was 6,889,000 cubic feet of logs, and 9,753,000 feet of deals, &c., this last year it has been only 4,974,000 of logs against 12,125,000 feet of deals, evidently showing that the feeling of the country is in favour of the foreign-manufactured article. Within a few years the price of pine in Quebec has been nearly doubled, and from present prospects there is not much chance of any reduction, so that we cannot hope for any extension of this trade, although with light stocks on hand, and an improved feeling with the manufacturers, we may naturally hope for a satisfactory though limited business during the forthcoming year.—*Farnworth and Jardine's Circular.*

ANCIENT INDIAN MONUMENTS.—Above the ruins of the ancient city of Delhi rise two of the rare monuments the Hindoos lay claim to. One is the celebrated "Iron Pillar"—with its Sanscrit inscription—attributed to the fourth century, cast in one solid piece of metal, and upwards of 60 feet in height, although two-thirds of it are buried in the ground. Still older than this one is the great stone column, popularly known as the Lat, or the Staff of Feroz Shah, said to be an edict column of Asoca, one of the number of monoliths that monarch erected in the third century.

ANCIENT TUMULUS IN BRITTANY.

On Monday last Mr. Eugene A. Conwell read a paper before the Royal Irish Academy "On a Tumulus and Chamber in the Island of Gavr Inis, Morbihan, Brittany," and described the conditions of the purchase of the island in 1832, in regard to the treasure supposed to be concealed in this tumulus, and the subsequent clearing out of the interior chamber and gallery, measuring 50ft. 8in. in length. The large blocks composing the walls and roof were not of the native rock of the island, but (excepting three, which were quartz) were granite, and must have been procured from the adjoining continent. Supposing this monument to have been erected by an essentially primitive people, and at a period subsequent to the time when the present Island of Gavr Inis was a portion of the adjoining continent, what a miracle of mechanical power must have been exerted to drag these immense blocks to the shore, to place them on solid rafts, and, after disembarking them, to haul them to the opposite end of the island, where the tumulus is erected adjoining a cliff! The paper was illustrated by three large sheets giving minute details of the general plan and section of the tumulus, with ground plan, elevation, and measurements of the stones composing the interior chamber, planned and drawn in 1868 by Sir Henry Dryden, Bart. (the present head of that house which two centuries ago gave to the world of letters the poet John Dryden), and Rev. W. C. Lukis, together with twenty-one sheets of drawings of the sculptures on the stones, executed by Sir Henry Dryden. No capstone, and only one pavement stone was found sculptured. Twenty-two of the upright stones were profusely covered with sculptures, of the intended significance of which, whether idiographic, symbolic, or intended merely for ornamentation, the author could offer no explanation. He said that a little stone turned up near Rosetta, on the western mouth of the Nile, by a French officer of engineers, in the month of August, 1799, had, from its fruitful contents, led to the deciphering and reading of what had become mystic characters on the Pyramids of Egypt; and if we doubted the possibility of such another lucky accident leading to the interpretations of the characters before us, may we not at least hope that by collecting them, and closely analysing and comparing the analogies of the characters, some future antiquary will do for archæology what Whitley Stokes has done for language, and unravel to future generations the mystery which is at present impenetrable to us—viz., the exact import of every line, and curve, and figure on these monuments of past times? Mr. Conwell also exhibited two series of drawing. from the cairns on Sliabh-na-Caillighe—one to show the kindred character of the ancient sculptures of Ireland and Brittany, and the other the sculptures on twenty-eight inscribed stones in a single cairn on Sliabh-na-Caillighe, exhibiting an elaborate diffuseness and a variety of characters unequalled in any single cairn hitherto opened and described in any part of the world.

THE SOUTHERN THAMES EMBANKMENT.

Though that part of the Thames Embankment north of the Thames is as yet of comparatively little use, a portion of the southern section of the work is being utilised with a vengeance. At the last meeting of the Lambeth Vestry, Mr. Hart drew attention to the fact that a portion of the Embankment was used as a coal wharf! Mr. Turner said that the Act of Parliament, under which the Metropolitan Board constructed the works, did not empower them to build any portion of a wall for a coal yard. The public money so spent was thrown away. Mr. Fowler quite agreed with Mr. Turner that the appropriation of a part of the Embankment for such a purpose was a shameful thing; but he explained that that portion of the Embankment formerly belonged to the London Gas Company; and unless an arrangement for giving the company the use of the Embankment at that part had been made, an enormous price would have had to be paid for the land. We should like to hear more of this matter. Why could not the gas company have had an approach for its coal barges underneath the roadway of the Embankment, in the same manner as at Messrs. Doulton's potteries, where barges laden with clay pass some distance inland?

NOTES ON SOME OF THE TIMBER BUILDINGS IN ENGLAND DURING THE MIDDLE AGES.*

(*Continued from p.* 47.)

It was a very usual arrangement to construct a gallery over the screen, to accommodate the musicians who played during dinner and on festivals, and it served as a passage to some of the upper rooms. The hall at Crowhurst Place, however, it would seem never had one, and in some cases the gallery was not quite open to the hall; At Chiddingley Place, in Sussex, the gallery front was enclosed with a range of folding shutters, which opened to obtain a view into the hall.

Very often there were small lattice windows and other openings in the walls between the hall and some of the upper rooms, from which a spectator could watch the proceedings in the hall without being himself observed; and for this purpose we find at the manor-house of Great Chalfield, in Wiltshire, stone masks of a king and a bishop inserted in the walls, through the eyes and mouths of which, the same being pierced, a full view of the interior of the hall can be obtained.

Archbishop Parker, on the occasion of entertaining Queen Elizabeth at a banquet at Lambeth, writes:—

"If her Highness will give me leave, I will kepe my bigger hall, that day, for the nobles, and the rest of her traine; and if it pleases her Majesty she may come in through my gallery, and see the disposition of the hall, at a window opening thereinto."

Internally the hall was the largest and most important room in the house, and generally extended in height from the ground-floor or pavement up to the roof, the timber construction of which was seen from the interior. It was the most useful and the chief living apartment in the building. It was occupied by the owner, his guests, his retainers, and domestics in common; the servants occupying that part of the room which was below the dais. Here the host dispensed his hospitality, alike to his invited guest and to the wayfarer, who at the period now under notice had so often to ask for aid.

Although the hall was very often provided with a regular open fireplace in the side wall, as at Crosby Hall, London, and as at the hall of the college at Cobham, in Kent, yet the most common mode of warming was by kindling a fire on a hearth of tiles or bricks, in the middle of the room, and the smoke, after well filling the apartment, escaped through a hole in the roof, over which there was an erection to keep out the rain, with open sides, which in course of time was called the louvre, from the old French word "*l'ouvert*."

The central hearth, together with a very curious dog, or andiron, round which the fuel was piled, is still to be seen in the hall of Penshurst Place, in Kent; and it is only a few years since that the dining-hall of the King's Scholars at Westminster was warmed in a similar manner, and where the original louvre on the roof is now in existence.

The hall of Richmond Palace was warmed in the same way, as we find by the description of it, made by the Commissioners of Parliament, A.D. 1649:—"This room hath a screen in the lower end thereof; over which is a little gallery, and a fayr foot-pace in the higher end thereof; the pavement is square tile, and it is very well lighted and seeled, and adorned with eleven statues in the sides thereof; in the midst a brick hearth for a charcoal fire, having a large lanthorn in the roof of the hall fitted for that purpose, turreted and covered with lead."—Vetusta Monumenta, vol. ii.

Of louvres, properly so called, not many examples are now to be found, and most of those which are left have had the open sides glazed, as at Oriel and Wadham Colleges, at Oxford. There is one in its original condition, however, at Lincoln College, and another of the time of Henry VIII. formerly entirely of lead, is still left on the roof of the hall of Barnard's Inn, London.—(See p. 98.)

In later times the situation of the old louvre was occupied by a lantern, which lighted the upper part of the roof, as we find on Westminster Hall, and at the Middle Temple, and on the halls of Staple Inn and Gray's Inn, and at Lambeth Palace.

One of the most conspicuous features, even to a casual observer, of a timber-built house is certainly the projecting of the upper floors over the sides of the stories below. Writers on this subject have not sufficiently explained why such a construction was adopted.

A clever writer on the subject, says,—"Whilst towns were circumscribed by fortified walls, their principal streets were much crowded with inhabitants, so that every contrivance was used to gain room for dwellings. This was one reason why fabrics framed of wood and plaster were so common; as the thinness of their sides, and the gradual projection of the upper floors beyond the limits of the ground plan, made such houses more capacious than they could have been if built with walls of masonry."

But it is quite obvious that this is not the true reason, for the same system was adopted in the country, where land was of but small value. It is far more likely that the projections were intended to protect the lower timberings from the weather as much as possible, and consequently from decay.

The sides of the timber buildings of the Middle Ages are constructed in the following manner:—Stout wooden sills are laid horizontally a foot or two above the ground-line, on underpinnings of stone or brickwork, and very large upright story-posts are placed upon the sills at the angles, and at intervals of from seven to ten feet apart; some of these at Crowhurst Place measure as much as 14in. by 8in. in their sections, and where seen in the interior of the house are richly moulded: these posts support horizontal heads of timber, into which, as well as into the sills, the uprights are framed, tenoned, and secured with wooden pins. The intervening spaces are again divided by smaller timbers, sometimes by upright quarters about six inches wide and seven inches apart, as in the upper stories of Crowhurst Place; in other cases, as at Great Tangley, in Surrey, and at Boar Place and Hever Castle, in Kent, these minor timbers are placed vertically and horizontally, forming squares, round the intersections of which are timber quadrants forming circles; but this latter system of filling belongs rather to the latter half of the sixteenth century. The spaces between the timbers are latticed up with wattle-work, formed either of sticks or laths, and plastered over with clay or loam, well mixed, and held together with chopped straw; sometimes, however, the upright punchions or quarters have ploughed grooves in the edges, and a board, by way of a panel, introduced between each pair. This construction is by no means a common one, but it is adopted in some of the upper apartments of Crowhurst-place, particularly in the large room over the parlour at the lower end of the hall; and it also occurs in a very curious old house—probably that of the parish priest—situated in the churchyard at Penshurst, in Kent.

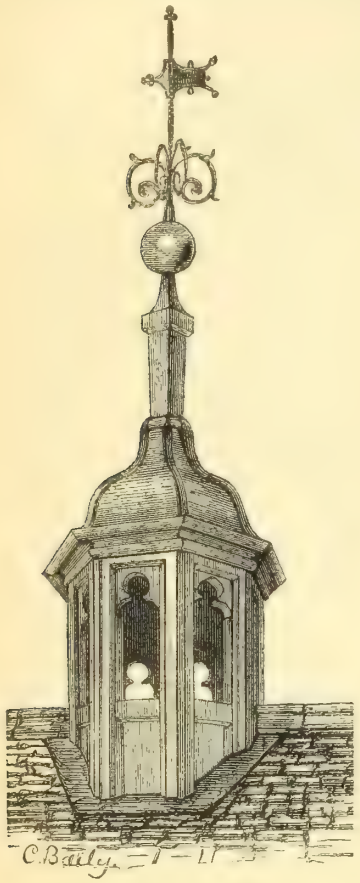
In the Midland and in some of the Northern counties, particularly in Cheshire and in Lancashire, panels of architectural figures, such as the quatrefoil, cinquefoil, and lozenge, are formed by the timbers; but this fashion does not appear to have at any time prevailed to any great extent in the south of England. There is, however, an example of quatrefoils in lozenges and in squares in a house standing in the churchyard at Rotherfield, in Sussex; and at Edenbridge, in Kent, is a building where some of the timbers take a fantastic form. The timber-built houses of Surrey, Kent, and Sussex, are generally not so rich in architectural ornament in the details as those in other counties, particularly Warwickshire, Essex, Suffolk, and Norfolk.

Where the spaces between the upright quarters are wattled up and plastered over with loam, the filling is not always made flush with the timbering, but the plastering is sometimes kept back about 1in. from the fronts of the wooden quarters, the edges of which in such cases are worked with a hollow moulding. This is the case at an old house in the village of Ightham, in Kent.

The plan adopted for forming the oversailing of the upper stories is worth notice. When this was required to be done to the front of the building, or on one side only, there was no great difficulty in the matter. So long as the joists were made strong enough to support the weight of the structure above without bending down, no great harm could happen; but it was very often requisite to carry the projections round the angles of the house, and indeed on all sides, and then a somewhat ingenious scheme was contrived. The princi-

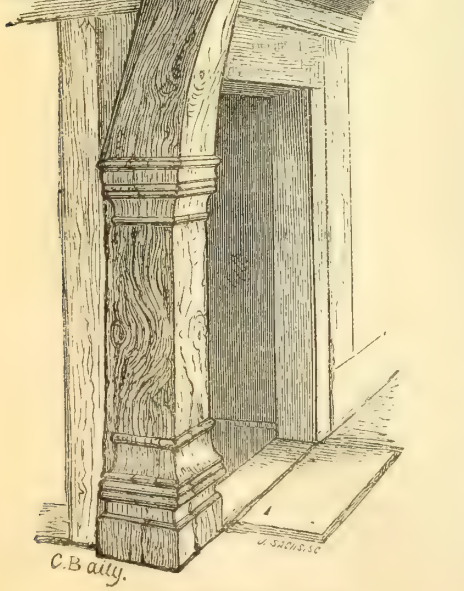
*Read before the Architectural Association, January 14, 1870.

pal upright posts of the framed sides support large girders in the floors ; these often cross each other at right angles, and hang down, and are seen internally in the ceilings of the rooms ; from the posts at the angles are laid, in a diagonal direction, other timbers to the cross-girders, into which they



LOUVRE AT BARNARD'S INN.

are firmly mortised and tenoned and pinned. These are technically called dragon-beams ; and by this means a good and sufficient bearing is obtained for the common joists of the floor, which are laid at right angles with each other, and project



AT SAFFRON WALDON.

over the front and sides of the building from two feet to four feet, and sometimes more.

The upright posts in the sides and at the angles of the building are generally larger at the tops than at the lower ends, to give a broader and firmer bearing of the girders which they carry, and are cut into brackets both externally and internally. These, in most cases, are got out of the same solid piece of timber as the post itself, which is generally the best part of the trunk of an oak tree turned the lower end uppermost, for the purpose of obtaining a sufficient width for the brackets ; these assist greatly to support the superincumbent weight. The example here given is from Saffron Waldon, in Essex.

(To be continued.)

COMPENSATION CASES IN NOTTINGHAM.

THE Midland Railway Company, in the course of the recent improvement and extension of their station and works at Nottingham, had occasion, under the compulsory powers which they possess, to purchase from the Corporation of Nottingham, in whom the property was vested, a certain branch canal called the West Croft Canal, which they filled up, and appropriated the site to the uses of the railway. This acquisition of property necessary for the purposes of the railway was happily effected by mutual agreement to the satisfaction of all parties, and the filling up of the branch canal, which was but little used, and had, in fact, become, on sanitary grounds, a crying nuisance to the neighbourhood generally, was admittedly a great public improvement.

There arose, however, the usual cluster of claims for compensation for injuriously affecting from owners of property on the banks who had the right of user of the canal, such as it was. The smaller of these claims became settled by agreement, but certain others of larger amount have recently been the subject of arbitration under the 68th section of the Lands' Clauses Act, with the results which follow :—

1st. Mr. Samuel Morley entered a claim for £1131, which was heard at the Nottingham Assizes, and was supported by the following professional witnesses—Messrs. T. C. Hine, R. Evans, F. Jackson, and J. C. Gilbert ; while the Railway Company were represented by Messrs. M. O. Tarbotton, T. Huskinson, J. S. Norris, and F. Bakewell, whose estimates ranged from £75 to £127. The verdict of the special jury was for £300.

2nd. Mr. James E. Hall claimed £2500, and was supported by Messrs. F. Jackson, R. Evans, T. C. Hine, and H. Goddard. The Railway Company's witnesses were Messrs. T. Huskinson, M. O. Tarbotton, J. S. Norris, and F. Bakewell, and after a consultation at the hearing it was agreed that the award should be for £1,300, plus a strip of land lying in the rear of the premises, formerly the bed of the canal. The arbitrator for the claimant was Mr. Jeremiah Matthews, and for the Company Mr. C. E. Cawley ; the umpire, Mr. Ryde, of Westminster.

3rd. Messrs. Shepperley and Whitehead entered a claim for £4000, which Messrs. R. Evans, F. Jackson, and H. Goddard supported ; and which was met on the part of the Railway Company by Messrs. J. S. Norris, F. Bakewell, M. O. Tarbotton, and T. Huskinson, whose estimates varied from £500 to £664 ; the umpire, Mr. Hunt, of London, awarding £1150. Mr. Matthews and Mr. Cawley were again the arbitrators.

4th. Mr. Henry Hind's claim, the last settled, was for £3000, and was supported by Messrs. F. Williamson and R. Evans, surveyors, and Mr. R. Hubbart, accountant. The Railway Company's valuers were Messrs. M. O. Tarbotton, J. S. Norris, T. Huskinson, and F. Bakewell, who gave estimates of the damage sustained varying from £432 to £520. The arbitrators were, for the claimant and the Railway Company respectively, Mr. Henry Goddard and Mr. C. E. Cawley, and the umpire, Mr. Pownall. The last-named gentleman has just published his award, which is for £780 in full of all claims.

THE INSTITUTION OF CIVIL ENGINEERS.

At the meeting of this Society on Tuesday, the 1st inst., Mr. Charles B. Vignoles, F.R.S., President, in the Chair, twenty candidates were balloted for and declared to be duly elected, including six members, viz. : Mr. George Allan, Leadenhall-street ; Mr. Alfred W. Craven, New York ; Mr. George Clementson Greenwell, Engineer of the Poynton and Worth Collieries, Cheshire ; Mr. James Hendry, Westminster ; Mr. Samuel Guyon Purchas, Engineer to the Local Board of Health, Worcester ; and Mr. John Bell Simpson, Blaydon-on-Tyne. Fourteen gentlemen were elected Associates, viz. : Captains W. H. Beckett, B.I., P.W.D., Government of India ; Mr. Henry Hakewill, Contractors' Engineer, Danish Railways ; Mr. James Innes Hopkins, Cannon-street, E.C. ; Mr. Thomas Horn, Westminster ; Mr. Wm. Chas. Luard, Landaff House, Glamorganshire ; Mr. Reginald Empson Middleton, Assistant Engineer, Solway Junction Railway, Annan ; Mr. Frank Morris, Resident Engineer of the Brentford Gas Works ; Mr. Gabriel James Morrison, Westminster ; Mr. Phillip Algernon Herbert Noyes, Stud. Inst. C.E., Rosherville Ironworks, Northfleet ; Mr. Arthur Cadlick Pain, Westminster ; Mr. John Thorpe Potts, Camberwell Grove ; M. Emile Theodore Quinette de Rochemont, "Ingenieur des Ponts et Chausées," Havre ; Mr. Walker Stead, Southport, and Mr. Edward Wilson, Westminster.

A report was brought up from the Council stating that, under the provision of Sect. IV. of the Bye Laws, the following candidates had recently been admitted Students of the Institution, viz. : Thomas Burgess Fry, William Greenwood, George Gatton Melhuish Hardingham, Joseph Heinig, Sidney Preston, Thomas Edward West, and Alexander Patrick Wright.

RAILWAY EXTENSION IN WALES.—The necessary surveys have been made on behalf of the promoters of the Carmarthen and Cardigan extension line from Llandyssul to Newcastle Emlyn. The distance is seven miles and seven furlongs, and the entire cost of an ordinary narrow gauge single line is estimated at (exclusive of Parliamentary expenses) £27,341, for which sum a contractor has agreed to carry out the work.

Building Intelligence.

CHURCHES AND CHAPELS.

BOW.—The United Presbyterian congregation at Bow are commencing the erection of a permanent church on a site in the Bow-road, at the corner of the Mornington-road. The church is designed after the Early French Gothic style, the successful architect being Mr. Alexander Peebles, M.R.I.B.A. The church, which will seat 875 persons, will be faced with yellow bricks, relieved with coloured stone bands, and the dressings will be of Bath stone. The principal entrance will be from the front, and the corner is flanked by a handsome tower and spire. Underneath the church will be a lecture-hall, with accommodation for 500 persons.

OLDHAM.—A new Friends' Meeting House has been erected opposite the Independent Chapel in Union-street, Oldham. The new structure is a commodious and suitably designed building, having a neat and rather ornamental appearance, with a good vestibule leading directly to a very light and handsome though plain committee-room at one end of same, arranged for being used separately or for being thrown open as a gallery on special occasions. On either side of the vestibule are placed cloak-rooms and other conveniences, those on the left being solely for the use of female members and attenders. In this matter of careful provision for the personal comfort of the attenders at their places of worship, the Society of Friends offer an example which other religious bodies would do well to follow. The contractor was Mr. Emanuel Whittaker, of Oldham, and Mr. Peter H. Alley, of Manchester, the architect.

BERMONDSEY.—A new Congregational chapel is in course of erection by Mr. Wells, builder, at Noel-road, Bermondsey. The building is of brick, with little attempt at ornamentation. There are three entrance-doors in the front elevation, the centre one leading to the body of the chapel, and those on either side to the galleries. The galleries will be supported on iron columns set in pairs, which are now being placed in position. In the new building 1000 seats will be provided for adults, and school accommodation will be given for above 700 children. The cost of the building, according to estimate, will be £4180. The site cost £800.

BATTERSEA CHAPEL.—A meeting connected with the movement for a new place of worship was held on Wednesday week. In the course of the evening Mr. E. C. Robins, the architect, exhibited plans of the new chapel, which gave general satisfaction. The style chosen is the Romanesque ; the site to be occupied is that of the old chapel, which was first erected 1736. It was enlarged at the settlement of the Rev. Joseph Hughes, M.A., 1797, and has undergone as many enlargements as it is capable of during the pastorate of the Rev. J. M. Loule. The estimated cost of the new chapel is £3500, more than £2000 of which has yet to be raised. It is to seat nearly 1000 persons.

BUILDINGS.

BRADFORD.—On the 27th ult. the foundation-stone of a new mechanics' institute for the town of Bradford was laid by Lord Houghton. The new building will cover an area of 1000 square yards. It will contain a lecture hall, in which space will be provided for 1000 persons ; a library and reading-room of ample dimensions ; and well-arranged suites of class-rooms. The Italian style of architecture has been selected by the architects, Messrs. Andrews, Son, and Pepper, of Bradford.

LAMBETH.—The business of the new Lambeth Police-court was opened on Monday in the new building just completed on the north side of Renfrew-road, Kennington-lane, nearly opposite the entrance to the old court, which was first used in December, 1845. The new edifice and the various fittings, &c., have cost between £9000 and £10,000. The building is of handsome elevation, in the Gothic style; the material externally is of red brick relieved with black and Portland stone dressings. The entire details have been carried out by Messrs. Hill, Keddell, and Waldram, builders.

Mr. V. Cole has been elected an associate of the Royal Academy of Arts.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

P. O. O's. to be made payable to J. Passmore Edwards, at the Strand Office. All cheques to be crossed on the Union Bank.

RECEIVED.—W. H. B.—J. V.—J. B. M.—W. and J. H.—W. H. R.—T. S.—F. S. S.—J. C. H.—R. B. E. and Co.—G. and X.—T. K. and Co.—T. H. P.—E. V. A.—B. I.—A. and P.—J. H.—W. R. T.—A. and Co.—T. R. H.—T. M.—W. H.—M. H. and Co.—A. and W. H. L.—G. P. R.

WM. SHORROCKS.—Inquire through an architectural bookseller.

THOS. R. HOOPER.—Your drawing came to hand; and though well sketched, is not of sufficient importance to be included in the Sketch Book series.

C. S. BECK.—With sketch of Parsonage, Great Snoring, Norfolk.

W. J. CHAMBERS.—With drawing of parsonage, and details. Not suitable.

BOOTH (Illingworth).—You will find an index to Vol. xvi. in the second number in July, 1869.

Correspondence.

PLYMOUTH GUILDHALL COMPETITION.—WHAT IS A REFEREE?

(To the Editor of THE BUILDING NEWS.)

SIR,—In answer to Mr. W. H. Lynn's query on this point, I wish to state my undisguised opinion, and at a future date, by your permission, to substantiate the same by facts.

The "instructions" given to Mr. Waterhouse authorised him "to examine and report on the various plans and the probable cost at which *each* could be erected; and that the selection of the designs to which premiums (*sic*) shall be awarded be postponed until the Council are in possession of such report."

That Mr. Waterhouse exceeded his duty, or received private and ulterior instructions, is proved by the nature of his report; and I am prepared to prove, from the inaccuracies therein stated (especially as to measurements), from private information, and personal correspondence with Mr. Waterhouse, that he has not acted impartially; but, reversedly, has allowed certain influences to bias his better judgment.

Subsequent proceedings on the part of the Town Council, and the amendment of the designs accepted, sufficiently illustrate the ill-treatment of the authors of designs submitted under the mottoes "Nina" and "Ich Dien," and as strongly testify that the design under motto "Fiat Justitia Ruat Cœlum" does not in any point meet the requirements of "the Metropolis of the West."—Yours truly,

W. H. REID, Architect.

22, Courtenay-street, Plymouth,
Feb. 1, 1870.

THE HOFFMANN KILN.

SIR,—I have read with much pleasure the interesting article in THE BUILDING NEWS by Mr. Redgrave, on lime burning, and as manager of the largest Hoffmann kiln in Ireland, allow me to state that we do not find the difficulties in the stoking, or filling and emptying, which Mr. Redgrave refers to; neither has it been requisite to employ skilled labour, all the men engaged having been previously common labourers, a little higher wage being given to one for acting as foreman.

Against any supposed inconvenience in filling, &c., there is to be taken the important matter of the expense saved in the stones not having to be broken small, as in the case of the ordinary kilns. As to durability, Mr. Murland had the kiln built of good materials originally, and although it has been under the constant action of the fires for the last two years, it is really as sound and looks as well as on the first day, and the repairs to the inside have been quite trifling.

Should Mr. Redgrave favour us at any time with a visit, he will be able to see that at Castle Espie, at least, only a small number of men are employed in proportion to the large quantity of lime manufactured, and that the alteration of dampers, etc., is made rapidly, and does not entail the necessity of an additional hand being employed. We find the saving in the cost of fuel as over 70 per cent., and Mr. Murland is so pleased with the results of this kiln that he contemplates erecting another one as soon as convenient. WM. MCNAMARA,

Manager of Castle Espie Works.

Castle Espie Works, Comber, co. Down,
Jan. 20, 1870.

THE VILLA IN ST. JAMES'S PARK.

SIR,—I see in your article entitled "A New Face in an Old Place" that you say, "As the tenor of our comments cannot upon the whole be complimentary, we forbear to particularise the authorship further than by saying that we are informed that the owner and his architect are from the provinces."

I am very much obliged to you for your consideration of my feelings; but there is not the slightest necessity for your forbearance; the building occupies a prominent public position, more especially as it is a little private villa placed under the very shadow, as it were, of Mr. Gilbert Scott's monster public offices, and both it and its authorship are therefore quite open to public criticism. I am the owner of the villa, and I selected the design of Mr. Charles E. Davis, City Architect of Bath, from a competition between him and a London architect of repute.

I am myself, I may add, perfectly satisfied with the result of Mr. Davis's designs.—Yours, &c., ALEXANDER W. MACDOUGALL.

Battle Fields, Bath, Jan. 25, 1870.

KNIGHTED ARCHITECTS.

SIR,—In your report of the Royal Institute of British Architects of last week you mention the name of "Sir Sydney Smirke" in two places. I have not seen it gazetted, but I hope it is true that this talented architect has received the honour of knighthood. Had he lived fifty years ago, it would undoubtedly have been so. King George IV., whatever his other shortcomings might have been, was certainly one of the greatest patrons and encouragers of art that ever mounted the English throne. Unlike the first monarchs of his name, who "hated boetry and bainting" he quickly made amends to art for their neglect of it. In his time there flourished Sir Jeffrey Wyattville, Sir William Chambers, Sir John Soane and Sir R. Smirke, while in this Victorian age, our authorities deem architecture to have so far retrograded that we can at present only boast of our Sir William Tite and Sir M. D. Wyatt, and they of very recent creation. Had it been the custom formerly, as it is now, to knight the architect only on the completion of a great work, Sir C. Wren would never have been knighted at all, and neither would either of the architects of George IV.'s time. It is now some years since Sir W. Tite erected the Royal Exchange, one of the principal buildings in the City of London, and now, nearly 30 years afterwards, he is knighted, It is almost a wonder he survived to receive the honour. It is the fate of some men to be born in an age when their abilities are not appreciated. The late Professor Cockerell was one of these. Had he lived in George IV.'s reign, I do not think he would have gone to his grave untitled. We only knight persons for municipal purposes nowadays—thus the Lord Mayor received the honour on the opening of the Royal Exchange, and again at the inauguration of the Blackfriars Bridge and the Holborn Viaduct, instead of the architects. The Chairman of the Metropolitan Board of Works receives it at the opening of the Thames Embankment. Why the constructors of our chief buildings, such as Messrs. G. G. Scott, S. Smirke, Haywood, Cubitt and Bazalgette, should be left unrecognised is a profound mystery.—I am, Sir, Yours, &c., DOUBLE YOU EFF PEA.

THE BUILDING NEWS SKETCH BOOK.

SIR,—I was glad to observe the suggestion of "Contributor" last week, and I think the introduction of original designs would be an entirely new feature, and would supply a want long felt in the profession. I feel certain it would be largely supported, and for my own part I should be happy to contribute a sketch.—I am, Sir, Yours, &c.,

JAMES H. ALLAN.

Intercommunication.

QUESTIONS.

[1759.]—HIPPED ROOFS, &c.—Will any of the numerous readers of THE BUILDING NEWS kindly inform me as to the custom generally adopted of measuring hipped roofs with gutters, drips, &c. ?—A SUBSCRIBER.

[1760.]—DRAWING PAPER.—Could any of the readers of THE BUILDING NEWS inform me what preparation renders drawing paper transparent enough to be able to trace through, and where it could be procured?—TRACING.

[1761.]—BATHS.—Allow me to ask your readers what is the simplest and cheapest system for hot water for a bath room, furnished from the kitchen fire or the *calorifere* which heats the house? Can such a system be sent easily, or erected in France, and about what is the expense? Would there be any duty?—A PARIS SUBSCRIBER.

[1762.]—BUILDING ACT.—A and B are owners of adjoining houses, separated by "irregular partitions;" on second floor A.'s property extends over ⅓rds of the area of B.'s house; above, the line of separation is same as below second floor. A wishes to build, consequently "party wall" must be in accordance with "act." To whom would the ⅓rds of second floor now belonging to A, belong? 2. If it should belong to A, how can he enter, if to B is he compelled to pay for it? 3. If B rebuilds, what would be his liabilities, &c.? I can find no provision for the above in the Building Act, and shall feel obliged if any one will inform me what is the usual practice in such cases.—R. C. J.

[1763.]—MACINTOSH.—I have an India-rubber reversible overcoat; lately the rubber has gotten very sticky, which has caused it to get bare in some parts; I should very much like to know what would be the best thing that I could do with it so as to make it waterproof again.—S.H.

REPLIES.

[1732.]—HURST'S HANDBOOK.—Your correspondent "Draughtsman" should be a little more careful in his replies to our queries. The difference betweed the figures and tables I quoted and which he repeats, is ·117 of a lb. in one lineal foot; this "Draughtsman" says is a *little over an ounce*, but in reality is 1·872oz, or nearly 2oz. If this is sufficient for his practical purposes it certainly is not for mine. Much better would it have been for him to give us the right multiplier; but how does he know the tables are right? Why not the multiplier right and the tables wrong?—H. A. R.

[1746.]—VERBAL ORDERS.—I am aware of what "Builder" asserts respecting the usual clause inserted in specifications, but at the same time it is not a dead letter. Its object is manifestly to prevent the accumulation of "extras." Although in strict law the execution of a verbal order would not hold, yet if a large amount of extra work had been done on the strength of an undisputed verbal order, the contractor would undoubtedly recover the money for it. No court would allow an architect to give a verbal order for work to be done, and then shelter himself under the saving clause in the specification when the time arrived to pay for it.—S. S.

[1750.]—CHURCH LAMPS.—In reply to "E. T. P.'s" query, I beg to say that I lately built a small church in the counry (to hold 300 people), and gas not being obtainable, I lighted it with paraffin lamps, and they do very well indeed.—D. H., S. Andrews, Scotland.

WATER SUPPLY AND SANITARY MATTERS.

WIMBORNE SEWERAGE.—At the last monthly meeting of the Wimborne sewer authorities, the tender of Mr. David Ridout, of Wimborne, was accepted for the construction of the first section of the main sewer from opposite the Coach and Horses Inn, on the Poole-road, to the River Stour, below Canford-bridge. The work is to be commenced on March 1st next.

WANT OF MORTUARY-HOUSES IN EAST LONDON.—Dr. Liddle, in his last quarterly report on the district of Whitechapel, calls special attention to the want of a mortuary in that part of London. He tells us of a small room occupied by three persons, in which the corpse of a child who died of fever was kept for nine days?

UNWHOLESOME WATER.—The *British Medical Journal* asks—"How is it, though it has long been admitted that the use of unwholesome water plays an important part in the causation of disease and death, no practical steps have been taken by the Government to prevent this injury? The Board of Trade does, or is supposed to, exercise some sort of supervision over London water companies. But why, when there is a Health Department of the State, a Board of Trade should have the control of a matter of such moment to the public health is not easily understood. The only cure for such a state of things as that to which we have referred, and which acts to the detriment of the public health, is, as has been stated over and over again, to have a Minister of Health, and then, when we get unity of supervision, we may begin to hope that sanitary acts will not only be directed to be done, but that care will be taken that they shall be done.

THE Royal Sanitary Commissioners will not resume their sittings before the second week in February.

Our Office Table.

HEARTS OF OAK BENEFIT SOCIETY.—The official auditor's report for the year 1869 has just appeared, and from it we learn that the Society began the year with 15903 members, and finished it with 18,369. During the year 3479 new members were admitted. The income for the year was £34,764 7s. 3d., against £30,249 5s. 9d. in 1868. The amount received was appropriated as follows:—£26,243 13s. 7d. was paid for sickness, funerals and other benefits; £669 14s. was spent in postage, reports, &c.; the cost of management was £1814 9s. 1d.; and the remainder, or £6036 10s. 7d. was added to the Reserve Fund, which now amounts to £60,562 6s. 6d. The whole of this sum is invested with the Commissioners for the Reduction of the National Debt, except the value of the Society's premises and furniture, and the balance in hand for current business. The management expenses are only £5 4s. 5d. per cent. on the gross income.

LEONARDO DA VINCI AS A BOTANIST.—Michael Angelo's versatility as a man of science is well-known, and we now read that another of the great Italian masters, Da Vinci, was the first to notice the constancy of a uniform arrangement of the leaves on the branches of the same species of plants. This is generally attributed to Grew and Malpighi towards the close of the seventeenth century. Da. Vinci, however, mentions the fact in his treatise on painting in the fifteenth century. He was also the first to describe the formation of concentric rings of wood beneath the bark of trees, by which the age can be determined.

ANCIENT SCOTTISH BELL.—The ancient bell which belonged to S. Fillan, one of the early Scottish saints, has been deposited by the Earl of Crawford—whose name is better known perhaps to our readers as Lord Lindsay—and the Bishop of Brechin in the National Scottish Museum. The *Court Circular* describes this bell as "made of yellow bronze, and four-sided." It will be remembered (says the *Guardian*) that

Sir Walter Scott alludes to St. Fillan in the Introduction to "The Lady of the Lake;" and a little village near Lochearn still bears the name of the saint.

Chips.

The statement, which appeared in a contemporary, and has been copied into several of the daily papers, that the exhibition of the paintings by the old masters would not again be held at the Royal Academy, but would take place in a gallery specially erected for the purpose at South Kensington, is entirely without foundation.

The exhibition of water colour drawings at the Dudley Gallery, Egyptian Hall, will open next week. The private view is on Saturday.

The ironwork for the roof of the Royal Albert Hall is now completely rivetted together, and the wedges on which it is temporarily supported will shortly be removed.

The late Mr. Alfred Davis has bequeathed, among other large charitable donations, the sum of £2000 to each of the following societies:—The Society of Arts, the Royal Horticultural Society, the Zoological Society, and the Royal Geographical Society.

An important series of copies of Early Christian fresco paintings, executed between the fourth and ninth centuries, and recently discovered in the subterranean catacomb of S. Clemente, at Rome, has lately been acquired by the South Kensington Museum.

The tender of Mr. Blackmore for widening the bridge over the London, Brighton, and South Coast Railway at New Wandsworth, has been accepted.

A site has been secured at Forest-hill for building a Presbyterian church.

The subject of "Sewage Farming" will be discussed at a meeting of the London Farmers' Club, on the 7th of March next.

A meeting has been held at Battersea to promote the abolition of tolls at the New Chelsea Suspension Bridge, It was resolved to apply to the Chief Commissioner of Works, praying the Government to let for building purposes, the Crown land at Battersea not occupied by the Park, and to devote the proceeds towards freeing the bridge from toll.

A proposal is on foot for the decoration of the new church at Kensington, now erecting from designs by Mr. G. G. Scott, with stained glass windows in memory of Newton and Hunter, both parishioners.

The last admitted batch of probationers to the Antique School of the Royal Academy comprised 11 ladies. Eleven were already in this school. Many of the probationers have studied in the schools of the Art Department at South Kensington.

About midnight on Thursday week a fire broke out on the premises of Messrs. W. Temple and Co., builders Newcastle-on-Tyne, and damage to the extent of about £5000 was done.

The foundation stone of a new hospital and dispensary has been laid at Rotherham by the Earl de Grey and Ripon. Miss Nightingale, of Rotherham, has promised £1000.

An infirmary for sailors and an institute are about to be erected at Holyhead. Upwards of £1500 has been already subscribed, and the Government has given a free site for the building.

The scaffolding is now removed from the whole of the upper portion of the Albert memorial in Hyde Park, displaying the richly gilt figures beneath the cross.

Some experimental granite curb has been fixed to form the banks of the Serpentine. This, if adopted, will be a great improvement upon the old plan of brick ends and clinkers.

An interesting collection formed by the Society of Arts of works illustrating the various reproductive art processes is now being arranged in the North Court of the South Kensington Museum.

The *Church News* states that on Monday a pastoral staff was presented to the Bishop of Winchester by Dr. Millard, the rector of Basingstoke, who presented it on behalf of the lady subscribers. The design was as we mentioned on a former occasion, selected by him, and consisted of an ebony staff with crook and bosses of silver and silver-gilt, richly engraved and studded with amethysts, carbuncles, and onyxes, the arms of the see also being engraved on it, by the Bishop's express desire.

The *Illustrated London News* says that a large model of the London districts, showing the Thames embankment and the Holborn Valley Improvements, is being executed by order of Mr. Lowe, and will shortly be placed in the South Kensington Museum. The object of this model is to aid in properly disposing of sites for public works. Both of the proposed sites for the new Law Courts are shown upon it; and that on the Embankment is occupied by a model of the experimental design of Mr. Street.

The meetings of the Society of Antiquaries are fixed for the following evenings this season:—Feb. 3, 10, 17, and 24; March 3, 10, 17, 24, and 31; April 7 and 26 (anniversary); May 5, 12, 19, and 26; and June 2 and 16.

MEETINGS FOR THE ENSUING WEEK.

MONDAY.—Entomological Society. 7.
TUESDAY.—Institution of Civil Engineers. Discussion on Mr. Harrison's paper, "On Railway Statistics and Expenditure." 8.
" Royal Institution. "On the Architecture of the Human Body." By Professor Humphry, M.D., F.R.S. 3.
WEDNESDAY.—Geological Society. 8.
" Society of Arts. "On loss of Life at Sea." J. W. Woods, Esq. 8.
THURSDAY.—Society of Antiquaries. Ballot for the election of Fellows. 8.30.
" Royal Institution. "On the Chemistry of Vegetable Productions." By Professor Odling, F.R.S. 3.
" Society for the Encouragement of the Fine Arts. "On the Culture of the Fine Arts, and its Influence on Industrial Habits." By Hyde Clarke, Esq., D.C.L. 8.
FRIDAY.—Royal Institution. "On Temperature and Life in the Deep Sea." By W. B. Carpenter, M.D., F.R.S., &c. 9.
" Architectural Association. "The Bed of the Tiber." By G. A. Sala, Esq. 7.30.
SATURDAY.—Royal Institution. "On Metereology." By Robert Scott, Esq, M.A. 3.

Trade News

TENDERS.

CITY.—For four new warehouses in Oat-lane, City, for Messrs. Knights, Wells, and Braham. Mr. Fred. Chancellor, architect, Pinners Hall, Old Broad-street. Quantities supplied by Messrs. Karslake and Mortimer:—

Turner and Sons	£8997
Brown	8800
Gamman and Son	8751
Conder	8450
Rider and Son	8375
Colls and Son	8100
Henshaw	7989
Hill, Keddall, and Co.	7815
Browne and Robinson	7790
Brass	7736
Hill and Sons	7520
Crabb and Vaughan (accepted)	7218

CLAPTON.—For building a house with shop, Chatsworth-road, Lower Clapton. Messrs. Shaw and Lockington, architects. Quantities supplied:—

	Stone dressings	Cement dressings
Lewis	£852	£789
Lavers	827	792
Upson (accepted)	747	720

ESSEX.—For new farmhouse and homestead, Little Henham Hall, Essex, for Joseph Baxendale, Esq. Mr. Fred. Chancellor, architect, Pinners'Hall, Old Broad-street, and Chelmsford. No quantities supplied:—

Brown	£3160 0
Saundars	3112 0
Bell and Sons	2964 0
Glasscock	2905 0
Cole, Brothers (accepted)	2783 15

ISLINGTON.—For hot water and steam boilers, engine, and laundry fittings for the New Workhouse, S. John's-road, Upper Holloway. R. H. Burdon, architect:—

Turner and Co.	£1678 8 0
Cottam and Co.	1650 0 0
Hodge and Sons	1550 0 0
Fraser and Sons	1495 0 0
Benham	1467 0 0
Jeakes and Co. (accepted)	1323 0 0

(For Lifts to Main House and Infirmary Buildings.)

Benham and Sons	£230
Bunnett and Co.	200
Jeakes and Co. (accepted)	188

(For external Hydrants.)

Jeakes and Co. (accepted)	£132

LEICESTER.—For church of S. Paul, Leicester. Built of stone, accommodating 800 adults; sittings, 3ft. wide. F. W. Ordish, architect, Queensborough:—

Bradley, Rugby	£6467
Messrs. Myers, London	5849
Jackson and Shaw, London	5758
Dove, Brothers, London	5475
Widdowson, Leicester	5250
Fern, Leicester	4867
Neale and Son, Leicester	4765
Osbourne, Brothers, Leicester (accepted)	4489

RICHMOND.—For a villa. G. H. Page, architect:—

Sweet and Son	£1624
Gascoyne	1550
Aries	1530
A. and J. Smith	1477
Brown and Sons	1475
Bass	1460

STRATFORD.—For carcases of 22 houses at Leyton, Essex, for Mr. J. D. Meads. Messrs. John M'Dean and Kingdon, surveyors, The Grove, Stratford:—

Hunt and Elkington	£3500
Davis	3410
Turner	3300
Cardoza	3113
Boyer	3090
Fisher	2990
Knight	2956
Aitcheson and Walker	2860
Holding and Dickens	2820
Kelly	2817
Ingham	2795
Mansfield	2735
Bate	2640
Finch	2634
Russell and Parsons	2618
Surveyor's estimate	2508
Brickell	2420
Barnes	2400
Ladd	2300

MARGATE.—For alterations at the Duke's Head Hotel, for Mr. J. Sharpe. Mr. W. Lane Sear, architect:—

Bushell and Son	£1362

MARGATE. For building a Photographic Studio, for Mr. H. Goodman. Mr. W. Lane Sear, architect:—

Sayer	£550

MARGATE.—For partly rebuilding the Britannia Inn, for Messrs. Cobb and Co. Mr. W. Lane Sear, architect —

Bushell and Son (accepted)	£480
Hayward	477

SUBBITON.—For additions to Elm Lodge, for Mr. C. Owtram. Messrs. T. H. Rushforth and C. L. Luck, architects. Quantities supplied by Mr. Northcroft:—

Foster	£1466

SYDENHAM.—For forming roads and sewers on the Fairlawn Park estate. Messrs. McMurdie and Wagstaffe, architects and surveyors:—

Cheeseman, Deptford	£1050 0 0
Colson, Forest Hill	804 7 6
Pound, Bromley	799 0 0

WARLEY, ESSEX.—For a Wesleyan meeting house. Mr. J Leaning, architect:—

Dobson	£369
Canham	341
Shepherd	310
Everett and Son	318
Saunders and Son	308

CONTRACTS OPEN FOR BUILDING ESTIMATES.

PEST, Feb. 7.—For the supply of slates and for covering the roofs of the city slaughterhouses. Herr Julius Hennicke, architect, Berlin, Neue Börse.

CHICHESTER CATTLE MARKET, Feb. 15.—Contract No. 1.—For the laying out of the site of a cattle market, of about 6 acres in extent; comprising the metalling of the pens, standings, and roads, the construction of the drains, boundary walls, and entrance gates, and the removal and alteration of certain houses on the site of the market, together with the formation of a new road, and the diversion and covering of a portion of the Lavant course, and other works connected therewith. Edward Arnold, Town Clerk, standings for cattle, together with the wrought iron tethering-rings for horses and cattle. Edward Arnold, Town Clerk, Chichester.

BINGLEY, Feb. 12.—For the erection of two villas, near Bingley. James Snowdon, Architect, 78, Broomfield-terrace, Bradford.

BAYFORD, HERTFORD, Feb. 12.—For taking down and rebuilding the parish church at Bayford 2½ miles from Hertford. W. R. Baker, Esq., Bayfordbury, Hertford.

TWICKENHAM LOCAL BOARD, Feb. 7.—For the supply of 1000 yards grey broken pit road flints. Wm. Ruston, clerk, Twickenham.

TWICKENHAM LOCAL BOARD, Feb. 7.—For the supply of broken Markfield granite and broken blue Guernsey granite, all broken to a 2-inch gauge. Wm. Ruston, clerk, Twickenham.

ST. GEORGE'S HANOVER-SQUARE, Feb. 19.—For the supply of flints and gravel, Guernsey granite, masons' and paviors' work, supply of paving materials, workmen's tools, gasfitters' work, drain pipes, &c. Mr. J. H. Smith, Vestry Clerk, parish of S. George, Hanover-square.

CONVICT PRISONS, Feb. 26.—For the supply of ironmongery, cutlery, tin ware, and various other stores. The Directors of Convict Prisons, 44, Parliament-street, S.W.

WAR OFFICE, Feb. 24.—For the supply of materials and the performance of work at Sheerness Tower on Grain Spit, and Isle of Grain and Slough Forts. The War Office.

WATFORD, Feb. 9.—For restoring the exterior of the parish church. Mr. J. T. Christopher, Architect, 43, Lincoln's-inn-fields, W.C.

ISLE OF WIGHT, Feb. 23.—For the repair of the roads and highways, and other works, in the districts of tho East and West Medines for three years. Commissioners of Highways, Guildhall, Newport.

DUBLIN PORT AND DOCKS BOARD, Feb. 9.—For the construction of three screw iron barges. N. Proud, Sec., Port and Docks Office, Westmoreland-street, Dublin.

ST. SAVIOUR'S DISTRICT BOARD OF WORKS, Feb. 17.—For paving the carriage way in the districts of St. Saviour's and Christchurch, and for watering the roads. H. Sturmy, Clerk, Emerson-street, Bankside.

CHATHAM, Feb. 14.—For bricklayers', masons', paviors', carpenters', plasterers', slaters', plumbers', smiths', painters', and gasfitters' work. Royal Engineer Office, Chatham.

EPPING, Feb. 12.—For sinking and boring an artesian well. 17 B, Great George-street, Westminster.

METROPOLITAN ROADS, Feb. 8.—Contracts for men and horses for watering the roads, and for the sale of road sand. Office, 32, Craven-street, Strand.

DONCASTER, Feb. 18.—For erecting a chapel of ease, in Christ Church parish. Plans of Mr. B. S. Brundell, 1, Princess-street, Doncaster.

ORSETT, ESSEX, Feb. 16.—For additions and alterations to the Workhouse. A. H. Hunt, Clerk, Work-Romford.

PARTNERSHIPS DISSOLVED,

Welch and Co., Eden-st., Hampstead-rd., engineers—Brown and Davies, Runcorn, joiners—Matthews and Son, Wincanton, builders—Toull and Ambrose, Mortlake, builders—Taylor and Co., Leeds, ironfounders—Gamble and Co., Foleshill, lime and manure manufacturers—M'Intyre and Stock, Hulme, plumbers and gasfitters—Smith and Co., Keighley, ironfounders—Graham and Stranghair, Jarrow, steam sawyers—Wainman and Levick, water engineers—Ellis and Sons, Leicester, coal, lime, and slate merchants—Raggi and Harper, Douglas-street, Vincent-square, Westminster, and Ebury-street, Pimlico, marble merchants.

THE BUILDING NEWS.

LONDON, FRIDAY, FEBRUARY 11, 1870.

PROTESTANTISM AND THE CONVENTIONAL CHURCH TYPE.*

(*Continued from page* 86.)

"The despotism of custom is everywhere the standing hindrance to human advancement, being in unceasing antagonism to that disposition to aim at something better than customary, which is called, according to circumstances, the spirit of liberty, or that of progress or improvement."

MILL ON "LIBERTY."

THIS interference of the nave columns with the primary object of the building is not, however, the only fault of the prevailing system. The extreme length of plan to which it often leads is quite as fatal to the purposes to be fulfilled. The voice becomes inaudible in the middle aisle through distance, just as much as in the side aisles through the intervention of the columns. The same thing also happens, when, as is not unfrequent, deep transepts are added. Of minor features, again, much might be said, though the general disposition of parts is what it is chiefly proposed to consider. But in them, as in nearly everything besides, the prevailing type shows plainly that it is not the product of existing circumstances. Its whole character tells of a ritual in which the people had no part, not of a worship which they were intelligently to join. The nave was, in fact, an outer court for the laity. What was really held essential was what went on within—the work of the priests about the altar—and whether this was more or less visible to the congregation mattered little. Such was the theory on which our ordinary church arrangement was developed, and wherever it is not the theory of modern times, there the resulting arrangement is not that for a modern church.

And now turn to the quarter where, more than anywhere else, it *has* been attempted o produce a church for modern uses, and observe the second variety of the conventional type. Here the faults of its more ordinary form have been strongly felt. Here the practice of putting people by the hundred where they can neither see nor hear the service has been confessed to be the absurdity it is. What, then, is the expedient by which this absurdity is avoided? In an overwhelming majority of instances it is simply a reduction in the size of the nave piers. This may seem at first an easy way out of the difficulty. It needs no great skill or invention. It is to retain the conventional plan, merely putting small columns instead of large ones; but, unfortunately, this obvious expedient does not go very far. Used in moderation, it adds but little to convenience; pushed to an extreme, it ruins art and construction together. As to the extent of the space obscured, it makes no proportionate difference whether the nave piers are 3ft. or only 1ft. in diameter. Looking towards the pulpit, from one aisle at least, the larger columns would seem to overlap each other, while several of the smaller ones will still apparently touch. But as to the arcnitecture, it makes the highest difference. Thin piers lead to thin arches, to a thin clerestory, or none, and, for the sake of lightness, to a thin roof. The strength, character, and directness of ancient work give place to a tame unmeaning prettiness. Instead of a piece of good solid construction, the outgrowth of the real wants of the day, we have a lifeless copy of an unsuitable model. So far, indeed, has this process gone, that to certain classes the very name of Gothic has come to suggest flimsiness and slightness. That style which embodied the most thorough constructive science the world has ever seen, and which used it to obtain the most lasting results, has been parodied till some persons think it only fit for a masquerading dress to what Americans call "fancy buildings." Such an idea, it is true, finds no support from the practice of the recognised heads of the Gothic school. A more vital difference can scarcely exist than that between the true and false Gothic of the present period; between that which uses the Pointed style as the best mode of building known, and that which uses it merely as the best mode of making bad building presentable. These are the highest and the lowest points which modern architecture has touched, and, for various reasons, this lowest point is often to be noted in the thin-column type of church.

It is hardly worth saying much of the churches whose columns are only moderately thin, since they have all the faults, though in a somewhat less degree, of those with thick columns. And they become a little less inconvenient only by becoming a great deal less architectural. A large part of the congregation is still shut out, even by columns of this reduced size. On some fresh type of plan, moderate-sized piers of granite, or even clustered shafts of iron, might perhaps be used, so as to unite good architecture with perfect convenience; but on the ordinary nave and aisle system this is impossible. The alternatives here are "thick, or moderately thick piers and bad placing of the congregation," or "thin piers and bad architecture." Unless the nave piers are large enough to cause considerable obstruction, a design on this type is sure to be a starved and degenerate one of its sort. And below this size they are never found in any churches remarkable for artistic merit. In all such examples, if they follow the conventional plan, convenience is invariably sacrificed to strength and beauty. It seems natural to infer that our ablest designers feel them on this plan to be incompatible. If they did not, they would hardly make a constant rule of sacrificing the former to the latter, But the fact is not left to be thus inferred. A multitude of cases exist where the columns *have* actually been reduced enough to let nearly the whole congregation see and hear the service, and these show what the effect of such a reduction really is. These are, of course, the cases where iron columns have taken the place of the nave piers. Where, indeed, these iron shafts still carry arches of brick or stone, as at S Mark's, Notting-hill, and Trinity Church, Huntingdon, they are necessarily thick enough to cause considerable obstruction. In such cases there is often a compromise uniting the weak points of both varieties of the ordinary church type. The columns are far too thin to allow of due strength in the wall they carry, or to be well proportioned in themselves, and yet they are not thin enough to avoid much inconvenience to the congregation. The architecture is poor, and yet the arrangement is anything but perfect. And where, as at the Congregational Church, Burnley, the shafts are coupled to give greater thickness in the arches, though the architectural objection is lessened, the other remains. But more often the columns do not carry arches at all. Their superstructure is of wood, and their diameter only a few inches. Here, then, we have the nave and aisles plan in its last stage of attenuation. Convenience has been reached, or nearly so; but what sort of architecture remains? We see an elaborate timber roof (or perhaps worse, a heavy load of lath and and plaster magnificence) poised on thin iron props, which seem to tremble under the weight. We see the whole structure depending on shafts so slender that they would not even stand upright by themselves; of a material which the least outbreak of fire will ruin, and which a short period of neglect will decay—used in such small dimensions that even the ordinary effects of time will soon displace it and cripple everything connected with it. It is true that matters need not be so bad as this. Iron construction does not necessarily involve these taper shafts. The Oxford University Museum and the South Kensington Museum show what can be done with iron shafts by having them thick enough, and grouping them three or more together. On the conventional plan, indeed, they cannot be thus grouped and thickened without causing great obstruction; but this only proves that the conventional plan is a bad one for the purposes of a congregation. On a fresh plan, groups of iron shafts, or even massive iron piers might be used with some success, though stone piers will always have the advantage, not only in beauty, but in permanence. If cast iron can be effectually protected from rust by enamelling, one great objection to its use will be removed, though it will still be liable to destruction by fire. But, in any case, to be successful it must be used in sufficient mass. Strength and solidity, visible as well actual, are the first conditions of high artistic character; and if they could not be attained without practical inconvenience on a columnar system of church-planning, it would be infinitely better to adopt one without columns. There is something absurd in first fixing on a type whose very essence lies in its amply-proportioned nave piers, and then thinning these nave piers almost down to nothing because they are so much in the way. No type can have its proportions thus reversed with impunity. To copy a mediæval church and reduce its nave piers to the size of its window mullions is not more reasonable than to copy an antique statue and reduce its limbs to the size of its wrists. Admirable churches might be built without any columns at all, but never with columns (unless in clusters) only a few inches thick. Even in those ancient buildings, such as Stone Church, Kent, where grace and lightness have been carried furthest, the nave piers have about ten times the sectional area usual in these iron shafts. The latter are sometimes defended on the plea that Gothic admits of light and elegant proportions. Very true; but these bear the same ratio to an elegant Gothic column which a skeleton does to an elegant female figure. A roof balanced on straggling shafts almost too small to be noticed is a hopeless subject for design, as well as a very temporary specimen of construction. Dignity of expression is impossible when the main supports have wasted away to mere iron sticks. The massive pillars of our early churches have a grandeur which no ornament can add to, and the spindling roof-props of these late ones a meanness which none can take away.

So much for the interior of these iron-column churches, but what sort of form do they present on the outside? In other words, what kinds of roofing are found possible with such thin shafts? The roof with a stone or brick clerestory may be omitted from the list, for, though it is sometimes found with iron columns, such columns must then be thick enough to cause considerable obstruction, and the case therefore belongs to the first variety of the usual church type. A wooden clerestory has now and then been used with thin shafts, and but for its want of permanence this might be one of the least objectionable forms of the class. But the most usual arrangements are these three: either the single span roof, from wall to wall, over all three aisles; or the longitudinal roof over the middle aisle, with short transverse roofs over each bay of the side aisles; or the triple longitudinal roof. Of these, the first is much the commonest. It occurs very rarely in fair examples of the ordinary stone-column church—as, for instance, at S. Mary's, Stoke Newington, and somewhat oftener in old village churches of very unpretending exterior. But in these iron-column buildings it has till lately been almost universal; and undoubtedly of all the modes of roofing found

* The Congregational Year Book, 1870. Hodder and Stoughton.
The 15th Annual Report of the Wesleyan Chapel Committee, 1869.
The Baptist Handbook, 1870. Yates and Alexander.

in large Gothic structures it is the least compatible with high architectural effect. It gives a front nearly all gable, and a side nearly all roof. Used, as it almost invariably is, with low walls and a wide plan, it leads to proportions as squat and shapeless as can well be imagined. Where, indeed, necessity required it, buildings of a similarly low and wide form were doubtless at times erected in the best Gothic periods. In some few cases their exterior may have even been deliberately sacrificed to the interior, the former being devoted to plainness or even downright ugliness to gain additional grandeur in the latter. But it may safely be said that it was never attempted to make a Gothic exterior of these proportions imposing or ornamental. While its treatment is perfectly artless it may escape criticism. But the moment decoration is applied to it, at that moment it begins to be tainted with vulgarity. The mere fact of drawing attention by ornament to so uncouth a form argues of itself a certain want of perception. A wide, low building, overwhelmed by an enormous roof, is not convertible into a satisfactory church by any amount of tracery and carving. The customary attempts to disguise it only make matters worse. To put, for instance, as in multitudes of these churches, a tower over one of the gallery staircases, and a little bit of sham aisle over the other, does give an appearance of height to the front. Half its width being thus got rid of, its gable runs up in the centre as tall and narrow as can be wished. But this arrangement can only exist for a few feet in depth. The barn-like nave stands behind it in its original shapelessness. A row of buttresses with windows between them may adorn its sides, and a string of gablets may be added to conceal the roof; but when all this is done, two objects more discordant than the building and its front could hardly be brought together. It takes something more than a front to make a church, and something more than architectural adjuncts to produce architecture. The first necessity is nobleness of general form. Whatever the popular taste of the hour may say, finery is only wasted on a structure with the proportions of a shed.

(*To be continued.*)

POSITION OF THE FONT IN CHURCHES.

THE position of the font is of consequence in the arrangement of a church; but being dependent on other considerations than merely convenient appropriation of space, it becomes necessary to travel beyond strictly architectural limits to arrive at a proper conclusion. The rite of baptism has undergone great changes in administration, if not in importance and purport, since its institution and pristine celebration. "Baptism" denotes immersion or dipping under water, as was the early practice, and the name has been retained though the original method has been practically discontinued. As the ceremony became universal, modification was requisite, since an act that would be safe and pleasant in the climate of Palestine, and the tepid water of the Jordan, might be dangerous and repugnant in the chilly air and icy streamlets of high latitudes. Particular places thus came to be chosen, and edifices were devoted to the service. Our Saviour wholly, and the Apostles ordinarily, delegated the performance of baptism to other hands; but it seems to have been conducted exclusively by the bishops in the third century, and the only public baptisteries were connected with cathedrals. In those times candidates were carefully prepared by instruction, examination, and exorcism. Preference was given to the seasons of Easter and Whitsuntide, when great numbers were necessarily brought together. In some cathedrals the baptisteries remain, and the probability that in others the cloisters served the purpose is supported by the evidences of fountains in the midst of the garths at Durham and Wells. Restriction of time and place must have been prejudicial to the spread of the church, since the rareness of opportunity and necessity of a journey were serious obstacles. Out of this difficulty possibly arose the custom of washing the hands and face before entering the church. It served as a kind of pseudo-baptism for such as could obtain no other, and a reminder to those who had been duly christened. When baptism was entrusted to parish priests, and fonts were provided, water was still kept in distinct vessels for these personal lustrations, and the practice gave rise to the *stoups* frequently remaining near the doors of ancient churches. As infant baptism came into use, and sprinkling superseded dipping, the font diminished, and being taken into the church, became an object of interest and ornament. Some examples, both mediæval and modern, are very elaborate and beautiful. In the thirteenth century, Edmund, Archbishop of Canterbury, ordered that fonts should be provided, and kept under lock and key, to protect them from *sorcery*. The cover thus introduced was occasionally made to vie in size and handiwork with the font itself. It is still used, on account of the dignity it confers on the instrument of baptism, and for the rational object of keeping the contents clean. The nave, being the outermost part of our modern church, has to receive whatever the outer portions of the ancient building contained, and it is indiscriminately occupied by believers and unbelievers. It was decided by a Council of Carthage that the bishop should not forbid Gentile, heretic, or Jew, to enter the church and hear the word of God. The material fabric may be entered without any test of faith. It cannot be imperative, because not accurately symbolical, to place near the nave door, open as it is to all comers, an object directly connected with the sacramental mysteries to whose celebration the chancel is devoted. These mysteries commence with baptism, and the steps of the chancel would afford the most allusive position for the font. Confirmation is, in fact, a completion by the bishop of the ceremony commenced by the deacon, and the lapse of time between the two parts has been contingent sometimes on the age of candidates, at others on the convenience or indolence of bishops. The complete rite is the prescribed introduction to the Lord's Supper, and the font ought to bear a visible and opposite relation to the altar. Welby Pugin used to form the baptistery in the south-west corner, and that situation is often adopted in Protestant edifices. But in the elaborate Church of S. James the Less, Westminster, where Mr. Street appears to have studied the position of every object with extreme care, and where no door occurs opposite the chancel, the font, surmounted by a cover adorned with metalwork, is at the middle of the west wall. West, indeed, it is not, for orientation is utterly disregarded, and the axis of the building, instead of east and west, lies north and south. It may be safer, therefore, to consider the altar as the upper end, and to say the font is at the lower—*i.e.*, the north. This arrangement brings the one opposite the other, and the only question is whether the secular portion, the nave, or *oratorium populi*, ought to intervene? Were the chief entrance, the beautiful, or royal, gate, in its usual place at the west, the font could not be in this position, and there is a disturbing mobility in the question that ought to be set at rest. The space formerly taken up by pulpit, reader, and clerks' desks, might no doubt be as conveniently and worthily occupied by the font, which could nowhere be more correctly placed than in view of the whole congregation.

THE HAARLEM ORGAN, AND WHAT IT TEACHES.

ORGANS have come to be such essential parts of churches, that any additional and scientifically correct information, and hints as to their arrangement and position, must be, useful. The arrangement and position of well-known and good organs must also be matters of no small interest, as showing practically what is best to be done and imitated, and must indicate what is wrong in the present system. It is to be remembered that the place of an organ in a church or cathedral, has hitherto been considered solely with regard to its aesthetic or architectural effect in the building, the musical properties of the building as *part* of the instrument, having been unthought of. The celebrated Haarlem organ will serve to illustrate this principle. It is a very large instrument, and completely fills up one end of the building in which it is, and which is partly shown in the illustration in a recent number of THE BUILDING NEWS. It is so famous a performance that it is sheer heresy to advance anything against it, but it seems to us that nothing can be well worse than the position it occupies in the church in which it is, and the way in which it is arranged. In the first place, it is too big for the church, and seems to fill it with a confused compound of sounds almost deafening, and but shows that there ought always to be some definite proportion between the size of an organ and the building which it is intended to occupy. If it be too small, then is the sound lost, and if it be too large, the sound ceases to be be musical, and becomes a noise. The Haarlem organ was three years and a half in constructing, so that we may well suppose it was carefully thought over, and skilfully put together. It was commenced in 1738, and is, therefore, of the old school of organ building. It has 60 stops, many of which have *two* pipes to each key, and they are nearly all metal. It is said to have cost £10,000. It has 4088 pipes. What effect such an instrument as this would have if in a much larger building—which is called a cathedral, but is in reality but a large church—it would be difficult to guess, but of this there can be no doubt, that its power and beauty, and depth of tone would be infinitely greater than it is.

It must be observed that the organ stands close to the wall of the church, according to the usual precedent and practice, and that it has thus with other like arrangements been the evil example which has dictated the truly unfortunate position of the new organ in S. Paul's, close to the transept wall, and almost touching its roof. Another great defect in the Haarlem organ seemed to us to lie in the large number of pipes in the front of it, and the effort evidently made to get as much outside and surface show and sound as possible. It serves to evidence how much there is yet to be learnt and done in organ arrangement, and in the disposal of the several parts of an organ, always bearing in mind that such an instrument is for the double purpose of the interpretation of instrumental music, and also, and more frequently, of helping, not hiding, vocal music. The sound from this fine organ though so rich and full, is not a little heavy, doubtless due in great part to the way in which it is played, but yet more to its position close to the wall of the building. It is exceedingly disappointing and provoking.

The object in view in thus calling attention to this foreign organ is to suggest a new arrangement, and to point out one or two things in it well worthy of trial and imitation; but as change of any kind is very hard to initiate without some precedent to go by, it may be useful and interesting to hint at the novelties in the great organ at York Minster, as designed by its late distinguished organist, Dr. Camidge. This organ was built in 1829, contains 80 stops, and 8000 pipes, and cost £5000. It contains a remarkable cornopean, a grand ophicleide, and a cuba mirabilis, a mere nothing compared to the gigantic noise-maker which has been palmed off on the Dean and Chapter of Westminster as a musical instrument, and which must have cost so much. But the most remarkable invention in this York organ is its huge wooden pedal stop, the

largest pipe of which is 2ft. 6in. across, and which looks like a great kitchen chimney, and the sound from it—not at all disagreeable, though hardly musical—like the moaning of the wind in one. These pipes are not in the organ loft and along the floor of it, like those at Westminster, but are ranged behind the stalls upright, and on either side of the choir. The effect of these pipes in one of Handel's great choruses, and combined with the rest of the organ is, or was, very striking and singular; the whole cathedral shakes with the noise of them, the hallelujahs from the choir penetrating through this solid wall of sound like the shriekings of the lost! Poor Handel! Why should he be treated as he is, why should the instrumental accompaniment *always* be so loud as to drown the singers, and render the words utterly unintelligible? This stop was the special invention of the doctor, who, strange to say, was a great violinist as well as an organist and composer.

York Minster, be it observed, is a much finer place, as a musical building, than Westminster, and is inferior only to S. Paul's. The organ, happily, still stands in the centre of the loft. The organ of S. Paul's was built by Bernard Smithe, in 1697, so that it is of older date than that of Haarlem. It is impossible not to admire the solemn beauty, and the round, full, and rich tone of such instruments as that of Haarlem and S. Paul's, and when we contrast this tone with the sharper and thinner one of more modern and "improved" instruments, may it not be allowed us ask, Where, or in what, lies the improvement? All musical instruments, as a rule, are getting sharper, and so, to speak, more superficial—we know of no better word—and empty of true musical sound.

Organ pipes, like church bells, are getting cheaper. Big Ben, the result of science, is merely a huge bit of metal, like a great saucepan struck with another big bit of metal, but the great bell of S. Paul's—there was no science in Wren's day—is really a musical instrument, like the pipes of its organ. The sound of this bell, as heard *in* S. Paul's, is singularly fine, and shows how much is due to the building in which any musical instrument may be placed, as well as to the nature of that instrument itself. We have before alluded to the effect of the wretched paint with which this luckless building is coated, and to the result of it, as regards musical sound in it, but we believe that if all this paint were removed, and S. Paul's and its organ and screen restored, it would always be a place wherein all musical instruments might be tried and tested, say, on "festival" days; wherein a full band, as in some continental cathedrals, might well be added to the organ. But even if this cannot be, S. Paul's would still be a place where the musical ear of the public might always find a key to keep it true.

Another improvement suggested by the Haarlem organ is that of doubling the pipes of an organ. It is a very singular fact, and one which we believe has not before been noticed in any existing work on music, that if you take, say, a dozen or more voices, every one of them so indifferent as to be hardly bearable as *solo* voices, *i.e.*, all of them bad voices—if you take these and *combine* them, and cause them to sing together in simple unison, then is the result to the full as fine as a single musical voice, or a good solo voice. Some might feel it to be better. That a number of indifferent or bad things should by combination make up a good one, is not a little singular. It is for nature to explain this, for human sense certainly cannot. Would it not be the same with organ pipes; the thin nothingness of a reed stop, composed of a series of single pipes, might thus be converted into a thing of beauty by simply doubling or trebling or multiplying each single pipe in it. This is for organ mechanists to think about and try. We owe the frightful Westminster Abbey "tuba" to the fact of the introduction into the organ gallery of a solo cornet on festival occasions. Suppose Mr. Turle had consulted the Haarlem organ, as we have here done, and doubled or multiplied by four, or six, or seven, as they do at S. Peter's, Rome, this single sour cornet, would he not have got what he wanted—a real and fine trumpet stop, a "tuba mirabilis"? What the Abbey organ wants now, the "tuba" being gone, is a *softened* trumpet stop, just indeed what would be got by the multiplication of a good ordinary trumpet stop. No man can use it as he does. No question of mere expense in so wealthy and close a confraternity as Westminster ought to stand in the way of perfecting, as far as may be, the most useful thing in it, and certainly no more foolish modern Gothic notions should hinder the making perfect and restoring the organ to its proper and effectively working place.

It seems a very great pity that a series of well considered experiments cannot be made under the auspices of some society—for that seems the only way—for the purpose of accurately testing matters so important to all who care about churches or cathedrals; and the best way of doing this is for such a body as the Chapter of Westminster to do its work well and perfectly. Of course all this applies with even greater force to S. Paul's and to its Chapter. The old Haarlem organ fails from the fact of its confined and packed up position and small space, which cannot be remedied, but in S. Paul's it is simply the putting things back in their proper places—in other words *restoring* S. Paul's Cathedral, and then leaving it to the organist and the choir and the dead composers.

One other practical remark here occurs of a less experimental kind. It is well known that the only opportunity we have of hearing a church or cathedral organ by itself, or any sort of musical composition other than the usual stock hymn tunes and services, is the being "played out." It is very rare indeed that this playing out is anything else than a great noise, but it fortunately happens that at Westminster this is not so. It is a musical opportunity, and is indeed, as it ought to be, an essential part of the Cathedral service. I mention it particularly, because on a recent Sunday afternoon service, a very beautiful composition was very finely played by the sub-organist, but, strange to relate—Dean Stanley surely cannot know of it—the congregation were almost driven out by the vergers before it was well over. It was happily a little longer than usual. *Esto perpetua.*

C. B. A.

THE LATE MR. F. Y. HURLSTONE.

ON Thursday evening, the 3rd inst., the first special meeting of Session 1870 of the Society for the Encouragement of the Fine Arts took place, Sir Francis Grant, P.R.A., in the Chair. The object of the meeting was to pay a tribute of respect to the late Mr. F. Y. Hurlstone.

The CHAIRMAN, in opening the proceedings, said he was pleased to have it in his power to testify to the interest with which he personally, and as President of the Royal Academy, regarded that or any other society intended for the promotion and encouragement of the fine arts. He was glad to have an opportunity of paying a tribute of respect to one of whom he entertained a very high opinion. He (Sir Francis) had the pleasure of the late Mr. Hurlstone's acquaintance, and always found him a most amiable and accomplished man, and a man of great genius, as his works exhibited in the adjoining room testified. He was rejoiced to find that the Society of British Artists (of which Mr. Hurlstone was President) was still efficiently carried on under the presidency of Mr. Clint. In conclusion, Sir Francis said that the many independent art societies were extremely useful to artists and the public, as without their existence a great number of works could never be exhibited. Last year no less than 4526 works were sent in to the Royal Academy for exhibition, and it was impossible for that or any other individual society to meet so great a demand for space. After some further remarks by Sir Francis,

Mr. T. R. S. TEMPLE read a paper on the career of the late Mr. Hurlstone, and after referring to the great aid he rendered to the Society in the management of its affairs, Mr. Temple said that though he was not qualified to say that the deceased would leave his stamp upon the age in which he lived, he would say that Mr. Hurlstone was a man of great energy of character—that nearest approach to the man of genius. The Society of British Artists, of which for many years Mr Hurlstone was President, had, he was glad to say, signified their intention to devote a portion of their gallery in Suffolk-street to an exhibition of his paintings. After paying a high tribute to the geniality and yet firmness of purpose so conspicuous in his character, Mr. Temple said that the deceased's pursuits were not confined to painting. Familiar with the language and literature of France, Italy, and Spain, he was more than recompensed for any time expended in acquiring these by the facilities they gave him in the practice of his art. He treated the art-criticisms of the newspapers with undisguised contempt. Having been "behind the scenes" himself (his father was at one time proprietor and editor of the lately-defunct *Morning Herald*), he had frequently noticed the haste with which such notices were concocted, often by persons unqualified for the task. In conclusion Mr. Temple said that the deceased was instinctively an artist; art with him was a second nature. The profession of painting had lost a liberal-minded man by his death, and that art could never have too many sons of the force and genius of the late Frederick Yates Hurlstone.

At this stage of the meeting Sir Francis Grant retired from the meeting on account of indisposition, and was succeeded in the chair by Mr. Clint, President of the Society of British Artists.

Mr. HEAPHY next read a paper which treated more especially of Mr. Hurlstone's works, and of his extensive acquaintance with European literature. This paper was followed, and the meeting brought to a close, by short speeches by Messrs. Frederick Tayler (President of the Society of Painters in Water Colours), Henry Warren (President of the Institute of Painters in Water Colours), Fay, Henry Tidey, and the Chairman, all of whom testified to the great esteem in which Mr. Hurlstone was held by them, both as a man and as an artist.

ECCLESIASTICAL ART EXHIBITION AT ROME.

THE Paris and Lyons Railway and the Messageries Impériales Companies have announced a reduction of 50 per cent. on their charges in favour of all articles intended for the Roman Exhibition of Ecclesiastical Art, shortly to be opened. More than 500 packages from various parts have already arrived, America, both North and South, contributing largely. It has already been found necessary to increase the space originally assigned for the purposes of the Exhibition. For visitors to Rome the productions and objects belonging to the City itself will perhaps possess the greatest interest. The goldsmiths' work and jewellery, the mosaics, bookbinding, type-founding, and other industries, which attracted so much attention in the Exhibitions of London and Paris, will not only be much more worthily represented than they were there, but, according to a Roman correspondent, many treasures of ancient art, and of objects produced in the Cinque Cento, in which Rome is so rich, will be seen with a facility not possible at any other time, the sacred vessels of the Sistine Chapel being enough to furnish an exhibition in themselves alone.

RELIEF OF DISTRESSED ARCHITECTS.—The trustees appointed by Sir John Soane will meet at the Museum, No. 13, Lincoln's-inn-fields, on Thursday, the 24th of March, at twelve o'clock at noon precisely, to distribute the dividends which shall have accrued during the preceding year from the sum of £5000 Reduced £3 per cent. Bank Annuities, invested by the late Sir John Soane, among distressed architects, and the widows and children of deceased architects left in destitute or distressed circumstances. Forms of application may be had at the Museum, and must be filled up and delivered there on or before Saturday, the 12th of March, after which day no application can be received.

Civil Engineering.

THE FAILURE OF THE BRADFIELD RESERVOIR.

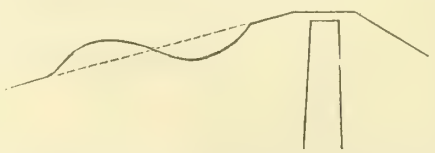
(*Concluded from page* 72.)

NOW, as to the settling of the pipes, and in that way drawing the joints. Puddle is about the most compact thing there is about a reservoir. It is made so purposely, by cutting up the clay and treading it into a homogeneous mass, without interstices. Not being very cohesive, it will yield to pressure, no doubt, if there be room for it to spread, but it is supported below by the solid ground, sideways by the solid sides of the trench, above held down by great weight—the very weight, indeed, that is supposed to make the pipes sink. That puddle subject to great compression is more solid, and occupies less space than it did when first made, is probable enough, but then that must be by compression from all sides alike, and not from one only.

In respect of this sinking of the pipes in puddle, it was said they ought to have been supported on solid masonry; but the consideration is this, Is a slight sinking of an inch or two here and there in a line of pipes (which the sockets fully allow without injury) a greater objection than the risk of the crushing of such a thing as a cast-iron pipe? The former is immeasurably to be preferred to the latter. A cast-iron pipe laid on an unyielding foundation and subjected to great pressure is a weak affair—it is an arch without abutments. But we may drop arguments in this case when we see that Messrs. Simpson, Hawksley, Bateman, Fowler, and Harrison examined the pipes *in situ* after the accident, and found, by applying hydraulic pressure to the interiors of the pipes, that they were wafer-tight, and, by drawing candles of equal length through the pipes, that they retained their original level, or, rather, that there was no great depression anywhere.

The creep of water along the outside of the pipes fares no better when criticaly examined. Fifty projections of nearly 3in. all round a line of pipe only 500ft. long present such obstacles to the passage of water along the outside of the pipe as to render it highly improbable that water could be forced in this direction with any such head as 90ft. or 100ft., even supposing that the great weight over the puddle surrounding the pipes did not bind it so tightly to them as to make it almost impossible to force water along such a line at all. In conclusion, on this subject, to attribute the bursting of the Bradfield reservoir to any defect in the pipes under the embankment is to attribute it to a very improbable occurrence. This is not said with any approval of the method of placing valves only at the outer ends of discharge pipes. That method is altogether wrong. Let there be valves at the outer ends for convenience, but place valves on the inner ends for safety in case of unforeseen occurrences. Mr. M. B. Jackson, of Sheffield, an engineer who made the Melbourne Water Works, and others in Australia, gave his opinion to be that water had certainly—he was very certain about this—got into the outer part of the bank and caused it to slip. But although he offered some very good remarks on sinking a puddle trench in ground that gave out water, saying that the fissures ought to be plugged—he said with wood, but cotton waste is better—and in that case the great depth of 60ft. would perhaps not have been necessary, yet he seems to have failed to discover the cause of the accident by attributing it to the passage of water under the puddle and up on its outside into the materials of the bank, saturating it so as to cause it to slip. He seems to have forgotten the formidable toe of stone, 50ft. high, and containing 24,000 cubic yards, that was placed to the foot of the outer slope to prevent this very slipping which he said was the first cause of the failure, and which did prevent any such slipping, in our view of the matter.

What, then, was the cause of the failure of the bank? A slipping of the inner slope, which held up the thin puddle wall. As long as the puddle wall was held up it resisted the passage of any water, being very well put together, but being very thin, only 4ft. at the top, with a batter of $\frac{3}{4}$in. on each side, it could not stand against the lateral pressure of the outer part of the bank when the support of the inner part was removed. But was it removed? Let us see what evidence we have on that. Within a week after the accident the present writer found the inner slope of bank to be in this form on the portion of the bank that remained on the Northern side of the valley, and adjoining the breach.



That of itself would be a small matter if it were unsupported by evidence of what occurred at the time of the accident. Of all the witnesses at the inquiry Mr. John Gunson, the resident engineer of the works, was the most to be relied upon, because of his intimate knowledge of all the circumstances, and his fearless and honest statement of what occurred. He, however, more than anyone else, could not account for the accident. His evidence, however, and that of one of the workmen, taken together, are sufficient to account for it when we recollect the nature of the material of which the inner part of the bank was made—shale of the coal measures—and how it was put together.

The raising of the bank was completed in April, 1863, when the top, in the middle of the bank, was 7ft. 4in. above top-water level—2ft. 4in. above the level at which it was intended that it should settle to eventually. The water was admitted in June—same year—and in two days it rose to 50ft. It had yet to rise 40ft. before the reservoir would be full. Floods do not come every day, and so the reservoir was not quite filled until the 11th of March, 1864. For a fortnight before that date the weather had been wet, and on that very day a storm arose with a westerly wind blowing a gale down the valley against the bank. Mr. Gunson had been at the reservoir most of the day on the 11th, but did not go over the bank because of the spray that was blowing over. He went home about seven o'clock, believing all safe. The reservoir was then full within a few inches, and the inner slope was, of course, covered with water. He was telegraphed for about nine o'clock, and at ten o'clock he arrived at the reservoir and went over the embankment, and saw a crack 10ft. or 12ft. down the outer slope, running horizontally along the bank, into which he could have put his hand edgewise, and thereupon he formed an opinion of the cause of that crack, which was this, in his own words:—"I thought it was the action of the wind and the waves that had been beating against it all the afternoon, and that it might have loosened the material that the inner slope of the top of the embankment is composed of above the water-mark; and if that had been the case I thought it would be like taking the inner slope of the puddle wall from it (meaning that the inner slope of the bank had been taken from the puddle wall) and cause a slight crack outside."

Here we have the solution of the mystery. The reservoir had been rapidly filled; the inner part of the bank had not had time to consolidate; the material of which it was composed was the slippery shale of the coal measures; slip after slip of the inner slope occurred until the puddle wall was left standing without support on the inner side, and the lateral thrust of the outer part of the bank bent it inwards and thereby opened a crack on the face of the outer slope 10ft. or 12ft. down from the top. Still the puddle wall prevented the passage of water out of the reservoir until the final slip of the inner slope occurred and let the top of the puddle wall fall inwards and allowed a sheet of water to flow over the bank, which would, of course, rapidly cut its way through the earthwork in more than a geometrical ratio of time.

Ninety-two thousand cubic yards of the embankment were carried away in half an hour.

What says the workman already mentioned? They do not give his name, but have numbered him "1."

"I went up to the reservoir about eight o'clock. I measured the crack in the bank; in half an hour's time it did not enlarge more than one-eighth of an inch. About ten o'clock I measured the crack again, it had then enlarged about a quarter of an inch. A two-foot rule would pass down the crack about 20in. Messrs. Gunson and Craven arrived between ten and eleven o'clock. At that time I went on the embankment. Those persons on the bank then observed the crack, which was about an inch wide in the widest place. Mr. Gunson and the contractors sent for drills and powder to blow out a stone from the top course of the waste-weir. It was observed that the water was lowering faster than the pipes could draw it off. This was named to the contractors. They thought it was not so; but they noticed it themselves afterwards, and were satisfied that it was lowering. Then they sent a man along the bank with a light, to see whether the water was escaping. He came running back to say that there was a hole blown through. Mr. Gunson and George Swinden, and others, immediately went over the top of the embankment. I went as far as I thought safe, and saw the water boiling through. I stood about ten minutes, and then the top fell in, which appeared to stop the water for a minute or two, uutil the water ran over the top in sheets of foam. An immense gap was speedily opened, and the bank where I stood began to incline towards the water, which was washing through. I immediately ran back towards the waste-weir, and had to stride over large cracks that opened. It was then by my watch about a quarter past eleven. Several weeks or a month before the bursting I observed the pitching on the inner slope of the bank had settled, forming a hollow, as near as I can tell, about the place where the hole was first blown through, just about the surface of the water at that time. I suppose the water was about 10ft. or 12ft. below the level of the waste-weir when I observed the sinking of the pitching."

These facts are strongly corroborative of the theory that the slipping of the inner slope was the first and only cause of the failure. It will be observed that the slope was $2\frac{1}{2}$ to 1. Had the inner slope been made 3 to 1, according to the more usual practice, and had the precaution been taken to place a toe of stone to the foot of the inner slope, as had been done to the outer one, there might have been no accident until the waste-weir had proved to be too short to carry off a flood coming into a full reservoir, and which the destruction of the flood channel had left as the only means of escape for it. In the meantime, however, the weir might have been lengthened, as has been recently done in another case.

These remarks are, of course, open to the objection that it is easy to be wise after the event, but whether easy or not the records of a failure are as instructive as any account of a success could be, if fairly stated, as we have endeavoured to state them, and with the view to arrive at the truth of the matter, simply, and not with any presumption to imply censure on individuals whose faults might have been equalled by our own in another form.

CIVIL AND MECHANICAL ENGINEERS' SOCIETY.
—THE KING'S CROSS STATION ROOF.

(Continued from page 50.)

THE discussion on this paper was continued on January 26th; after some remarks from the members and visitors present, Mr. A. T. Walmisley gave a description of some of the methods that have been adopted for resisting the horizontal thrust in arched roofs, as follows:—

M. Bancroft, to whom we are indebted for the exceedingly interesting and valuable paper on the Great Northern Roof, has furnished a very accurate account of the Derby Market Hall, which I was glad to see published in the various professional papers, and through the kindness of Mr. R. M. Ordish, I am enabled to exhibit before you photographs of this and of some other arched roofs. Mr. Bancroft stated that the area covered by the arched roof of the Derby Hall is a rectangle 192ft. long and 86ft 6in. wide, and that the larger holes in the web of the principals were punched out by a simple screw press, with long levers and heavy weights attached to them. This method seems to be the right way of treating wrought iron plates, the web only remaining where it acts in a similar manner to diagonals, and in my opinion produces a much better effect than when raised ornaments are employed; this plan was first adopted in the roof of the Great Western Railway Station at Paddington.

The base of each rib is fastened down by eight 1in. bolts on each side of the web to a supporting octagonal cast iron column 1½in. thick, and 23ft. in length from bottom of gutter to floor level. The base, which is plain, and about 2ft. 10in. high, has an inscribed diameter of 2ft. It widens out into an octagon foliated capital at the top, with an inscribed diameter of 2ft. 9in. Angle irons are bolted to a horizontal plate, supported by a bracket in front of a flat box cast on the top of the column above the capital. On each side of this bracket there are oblong openings in the horizontal plate which passes over the centres of the column, to which are attached semi-elliptical arches where the gutter joins the column. Thus an outlet is formed for the rain water. For sake of show, a casing of an equal thickness with the flat box, forming part of the column, hides a web forming the bracket under this horizontal plate. A frame is fastened by six bolts to the upper part of the column (supporting outlets) which is provided at the bottom with a lug for resting on the wall in addition to being fixed to it by four 1in. bolts. The horizontal thrust of the arch is not transmitted to the wall by this frame, as might at first sight appear. On the contrary, boxes are cast on the top of these frames, each of which contains a pin, dropped into it from above. These pins connect the ends of diagonal bracing rods with key adjustment at one extremity. A flange formed of two L irons and four plates running throughout the entire lengths of the building along the outer boxes, and decreasing towards the ends in strength, is connected to diagonals which increase towards the ends in sectional area by the pins. The gutter being sometimes exposed to a tensile strain, requires a thickness of 1⅜in., and is strong enough to act as the other flange of this horizontal girder.

There are eight diagonals, one for each bay, the roof being divided into eight bays of 24ft each. The roof is hipped at both ends, and simple ties serve as diagonals at the hips. The ribs here are similar to the ordinary ones, but of a greater sectional area. The vertical part of the base of rib is bolted to the inner flange 10½in. wide of a vertical piece of I iron into which the column changes immediately over the horizontal plate before described, the top flange of the rib being carried down vertically 2ft. 5in. above the base, which is horizontal, and the bottom flange of the rib being carried round horizontally for the purpose of receiving the 1in. bolts. The wrought iron lattice purlins are radial at intervals of 6ft. 9in., and are prevented from projecting beyond the ribs by means of a cast iron strut ⅜in. thick fixed to purlin and rib by six bolts.

A board 8¾in by 1in. is fixed for appearance sake to the soffit of the rib. Such boarding is nailed on to wood 5½in. by 3in., fastened on to the top of main ribs, near the crown; this is covered by Italian zinc, but at the lower part it is slated. One square of area covered requires nearly 15 cwt. of wrought and cast iron. One ordinary rib weighs 5¼ tons, and the height at crown is 62ft. 10in. above floor level; the weight of standards, purlins, &c., per bay is 9½ tons. No provision is made for any additional horizontal thrust such as would arise from pressure of wind or snow, the roof offering a very great resistance in its longitudinal direction. The contractor for this roof was Mr. James Haywood, of Derby.

Iron roofs may be divided into two great classes, of both of which there are several varieties and combinations. These two kinds are usually termed trussed and arched. In the case of an arch the consideration of the following exterior forces is involved. (1), the weight of the structure; (2), the horizontal pressure due to the resistance of the abutments which is transmitted unaltered through the whole of the rib, and in consequence of which lateral strength must be provided for in the abutments; (3), the pressure of wind and snow of about 40lb. per square foot. The stability or rigidity of an iron arch can be guaranteed under various arrangements. In nearly every roof we find a new arrangement for resisting the horizontal thrust, and different methods adopted in the design of the principals, for which no rules can be assigned; a double row of braced columns, sometimes affords a base of sufficient extent to resist the thrust of an arched roof which, in the case of the Agricultural Hall at Islington (125ft. central span) is conveyed through the gallery girders to the outer walls; the total cost of which, exclusive of erection and covering, was about £12 15s. per square.

The Midland roof, adjoining the Great Northern, is a good specimen of a rigid roof in consequence of its enormous span and weight, for the stability of an arched roof increases with its weight and size. Until this roof was erected the central roof of the Agricultural Hall, designed by Mr. Frederick Peck, was the largest roof in existence constructed with principals without ties between the walls to resist the horizontal thrust. If the walls carrying a roof are strong and heavy it is unnecessary to make any provision for the expansion of the principals through variation of temperature, for the effect of contraction or expansion upon an arch with immovable abutments is simply to cause the crown to fall and rise.

In the St. Pancras station roof we find beauty and strength combined, the pointed arch presenting a better and more pleasing appearance than the usual forms. Besides, it being more profitable to employ a structure on which compression principally prevails, ties and other such obstructions are not presented to the view. Had this roof been constructed in two spans, as in the Great Northern, the cost would have without doubt been far less, and it has been argued that columns in the centre of the station would not have been much more in the way of passengers than ordinary lamp-posts, seats, &c., which are usually placed in large stations; but then it must be remembered that the latter can be easily removed without endangering the structure should it at any time be necessary to change the position of the rails and platforms, whereas in a station of two spans the central columns might be found at some future time to be in the way of an advantageous arrangement of the platforms. Another point in favour of a single span is that a better architectural effect is produced than would be with a double span in addition to the mere strength required to support the covering, and considering that railway traffic has been annually increasing, we cannot blame Mr. Barlow for desiring his terminus to be the finest and best arranged. Over 9000 tons of ironwork were employed in the construction of the Midland station, of which the main and cross girders of floor comprise about 20 per cent., the main ribs and spandrels 13 per cent., the cast iron columns and caps supporting the flooring about 12½ per cent., buckle plates 9 per cent., and the intermediate ribs, purlins, and connections 6 per cent. One square of area, covered partly with rough glass 3-16ths in. thick, and partly with slate, cost £31, and required about 17 cwt. of wrought and cast iron. The cost of erecting and supplying all the columns, girders, and plates forming the flooring, together with the iron, timberwork, glass, and other portions of the roof, was about £128,000. The roof, which is 690ft. long, with a clear span of 240ft., covers about four acres; its height at the ridge is 125ft. above the level of the road, and the segmental ribs meet in the centre at a height of 96ft. above the level of the platform. Each half of the main ribs consists of two segments of circles with radii of 57ft. and 160ft. respectively. There are twenty-five of these main ribs in the roof, between which trussed purlins at every 18ft. 6in. carry intermediate ribs of rolled I iron 10½in. deep. These purlins help to stiffen the lower flanges of the ribs externally. The gable is carried by two outer main ribs, the thrust being taken by a braced horizontal tie, and presents an area of 14,400 square feet. The gangway and gutter boarding were Burnettised. The timberwork received three coats of best oil paint after being fixed complete, and the underside of boarding to roof, which was at first proposed to be stained and twice varnished, is, I believe, also covered with three coats of paint. The contractors for the ironwork were the Butterley Company.

The travelling staging for the purpose of fixing the roof in its position was divided into three parts, the side ones consisting of five, and the centre of six divisions each, and from back to front there were four divisions. The first staging travelled on 123 wheels, 2ft. 8in. diameter, running on a beam of timber 18in. square, and was worked at the north end of the station towards the road, but after a few of the main ribs had been erected, it was found necessary, in order to complete the roof by the required time, to erect a similar staging about the centre of the station, which was also to travel in the same direction. The horizontal transverse pieces were 12in. by 6in., except the bottom pieces, upon which rested iron shoes to receive the feet of the standards 12in. by 12in. These lower horizontals were also 12in. by 12in. Each main rib was supported by the staging until the wind ties were finally fixed. More than 50,000 cubic feet of timber were employed, and a smaller separate staging was subsequently erected at the north end for completing the gable. This latter staging was so constructed that trains might pass under into the station before the completion of the work. Time will not now permit me to enter into a detailed account of the construction and method of moving the staging and hoisting gear, but a very good account was given in THE BUILDING NEWS about a year ago. Also the general plan of the building, arrangement of platforms, &c., was well described in THE BUILDING NEWS for February 12 of last year. Ventilation is amply provided for by open spaces in the skylights along the whole length of the ridge, and also where the glass overhang the gutters. The skylight is constructed on the ridge and furrow principle.

(To be concluded next week.)

SOCIETY OF ENGINEERS.

THE annual meeting was held on Monday evening, at the Westminster Palace Hotel. Premiums for papers read during the past session were awarded to Mr. Bartholomew, Mr. Hartley, Mr. Nursey, and Mr. Vaughan Pendred. The president, Mr. Wm. Adams, then read his inaugural address, in which he first reviewed in an able manner the topics treated in the discussions before the society at the meetings of the past year, and afterwards treated in a masterly manner the important topic of recent locomotive engineering. Dwelling forcibly upon the larger future introduction of steel in place of iron, and giving due credit to M. Chatelier's steam brake and Mr. Clarke's continuous brake, he entered into the vital subject of the proportions of dead weight in rolling stock. Upon this last point he made the following remarks upon the Fairlie engines, the value of which has been frequently urged. "These engines," he said, "appear to run very smoothly, and they take sharp curves with great facility. It is, however, quite a question for experience whether gain of adhesion will justify the cost of these engines and the entire duplication of the working parts. This system is now in the way of a fair practical trial. The steam carriage has already been working on the Sevenoaks branch of the London, Chatham and Dover Railway. Some small double bogie engines are working on the Festiniog Railway, and two more are about to be sent over to Sweden."

The Council's report showed the society's finances to be in a satisfactory condition, although the depression in engineering business had made itself felt upon them.

Mr. Strapp, the contractor for the proposed railway between Jassy and Kitchenieff, in Russia, has just issued a report on the undertaking, from which it appears that the line will cross the river Pruth by an iron bridge at Ungheny, where a station is to be built on the Russian side of the frontier. The length of the line is 135 kilometres, and it is to be completed in three years.

Building Materials and Appliances.

GENERAL JOINERS.

OF the many varieties of wood-working machines with which we have become familiarised during the past few years, there is probably none—if we except the ordinary circular saw bench—which has obtained such a strong hold on the public favour as the "general joiner." Introduced originally by the late Mr. Samuel Worssam, this machine has been added to, modified, and "improved" by almost every maker of wood-working machinery, and as now constructed by the leading firms it is capable of performing, with more or less efficiency, nearly every operation that a user of such a machine is likely to require to be performed by mechanical aid. In endeavouring to make "general joiners" available for a great variety of work and rendering them capable of performing two or more operations simultaneously, however, they have in some instances been rendered far too complicated, and no provision has been made to prevent a man using one side of the machine from being delayed while another man who may be using the other side is adjusting the work on which he is occupied. This is a serious defect, and greatly diminishes the amount of work which the machine is capable of performing in continuous work, by increasing the number of stoppages which it is requisite to make for adjustment, &c.

FIG. 1.

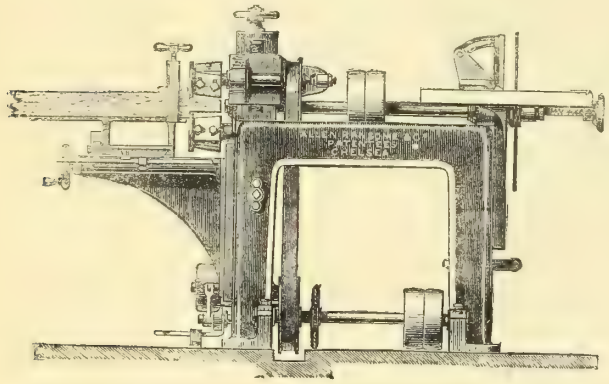
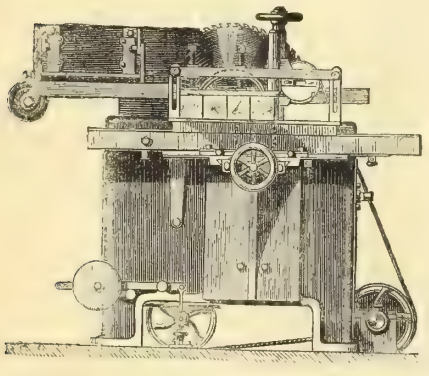


FIG. 2.



To avoid this inconvenience Messrs. Allen Ransome and Co., of the King's-road, Chelsea, in the arrangement of general joiner brought out by them during the past year, and illustrated by us in the present number, have, besides introducing other improvements, made that side of the machine employed for tenoning, planing, thicknessing, or moulding, independent of the other side at which such operations as ripping-out, cross-cutting, &c., are performed. The general arrangement of the machine will be readily understood by an inspection of the engraving, in which Figs. 1 and 2 show the machine as arranged for ripping and tenoning, whilst Figs. 3 and 4 represent it as arranged for planing and cross-cutting.

Referring to the figures, it will be seen that the saw spindle, which is also employed to carry cutters for tongueing, &c., is quite distinct from the spindles carrying the cutters for planing, &c., the former spindle being driven by a separate belt, and being provided with its own fast and loose pulleys, so that it can be stopped or started without interfering with the work going on at the planing side of the machine. The fence plate, too, which is shown in its position on the table in Figs. 1 and 2, is of light construction, and is so hinged to the table that it can be turned over endways and made to hang down beneath the latter, as shown in Figs. 3 and 4. When thus arranged the machine may be used for cross-cutting timber of any length and up to 4in. in thickness

At the planing end the machine will plane on both sides and thickness at one operation boards up to 7in. wide, the arrangement employed being shown in Figs. 3 and 4. The planing is performed by two sets of cutters, the spindle carrying the lower set—which act on the under side of the board—having a fixed position, while that carrying the upper set can be raised or lowered according to the thickness to be given to the work. The two cutter spindles are driven by a single belt, this passing, from a pulley on the main shaft, first over the pulley on the upper cutter block spindle, next under the pulley on the lower block spindle, next over a stretching pulley not shown in the figures, and finally back to the pulley on the main shaft.

The arrangement employed for tenoning is clearly shown in Figs. 1 and 2. It will be seen from these figures that the pieces of wood on which the tenons are to be cut, and which may have a total width of 18in., are clamped down to a light sliding plate, which can be traversed so as to bring the ends of the pieces between the two sets of revolving cutters by which the tenons are formed. The tenons being formed by cutters are more accurate than if sawn, and they can, moreover, be made with shoulders of unequal length by simply shifting one of the cutter blocks endways on its spindle. The arrangements by which the adjustments are made for various lengths and thicknesses of tenons will be readily understood from an inspection of the engravings without further explanation.

The machine we have described above, besides performing the operations of planing, tenoning, ripping-out, and cross-cutting, is capable of cutting single or double mouldings up to 5in. wide, grooving, boring holes up to 2in. in diameter, and cutting mortices up to 2in. wide, while it may also be employed for mitering, chamfering, beading, and rebating or moulding sash frames, &c. Practically it consists of two machines on one frame, and attended by two boys, or by a man and a boy, it will turn out a vast quantity of work. Multitudinous, however, as are the operations which the above machine can perform, its powers in this respect are exceeded by those of the other machine, also illustrated by us. This machine — which has been designed and patented by Mr. William Parkinson, the superintendent of the wood-working machinery at Messrs. Corbett and McClymont's saw-mill, Brompton, and of which Messrs. Allen, Ransome, and Co., are the sole makers—has been named the "universal joiner," an appellation which it well deserves. The machine really consists of three distinct parts, each capable of being stopped and started independently of the others, these being: 1st, a band saw for cutting curved work up to 10in. thick; 2nd, a circular saw bench with arrangements for grooving, rebating, mitering, &c.; and 3rd, a complete arrangement for cutting single or double tenons, planing, moulding, &c. The band saw and its table are arranged at one end of the machine, and their arrangement will be clearly understood without any special explanation. The other two divisions of the machine, which are carried by a single frame of simple and substantial design, we shall proceed to describe separately.

Beginning with the side at which the circular saw is placed, it will be seen from Fig. 4 that the saw is provided with a rising and falling spindle, and the latter can thus be fitted with cutters for rebating, mitering, &c. On the other side of the machine, and completely independent of the saw, are four other spindles, namely, two horizontal and two vertical. The two horizontal spindles, the positions of which are clearly shown in Figs. 1 and 4, are each capable of being raised or lowered, while one of the vertical spindles is capable of being shifted both horizontally in the direction of the slot in the table through which it is shown to pass, and also vertically.

FIG. 3.

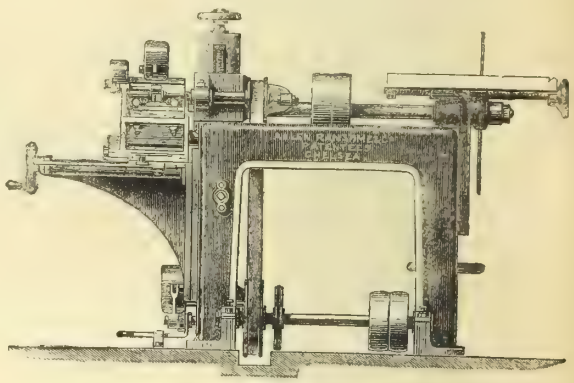
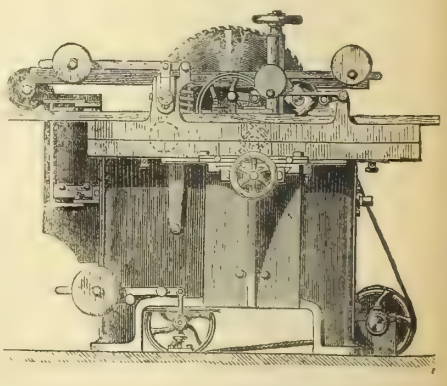


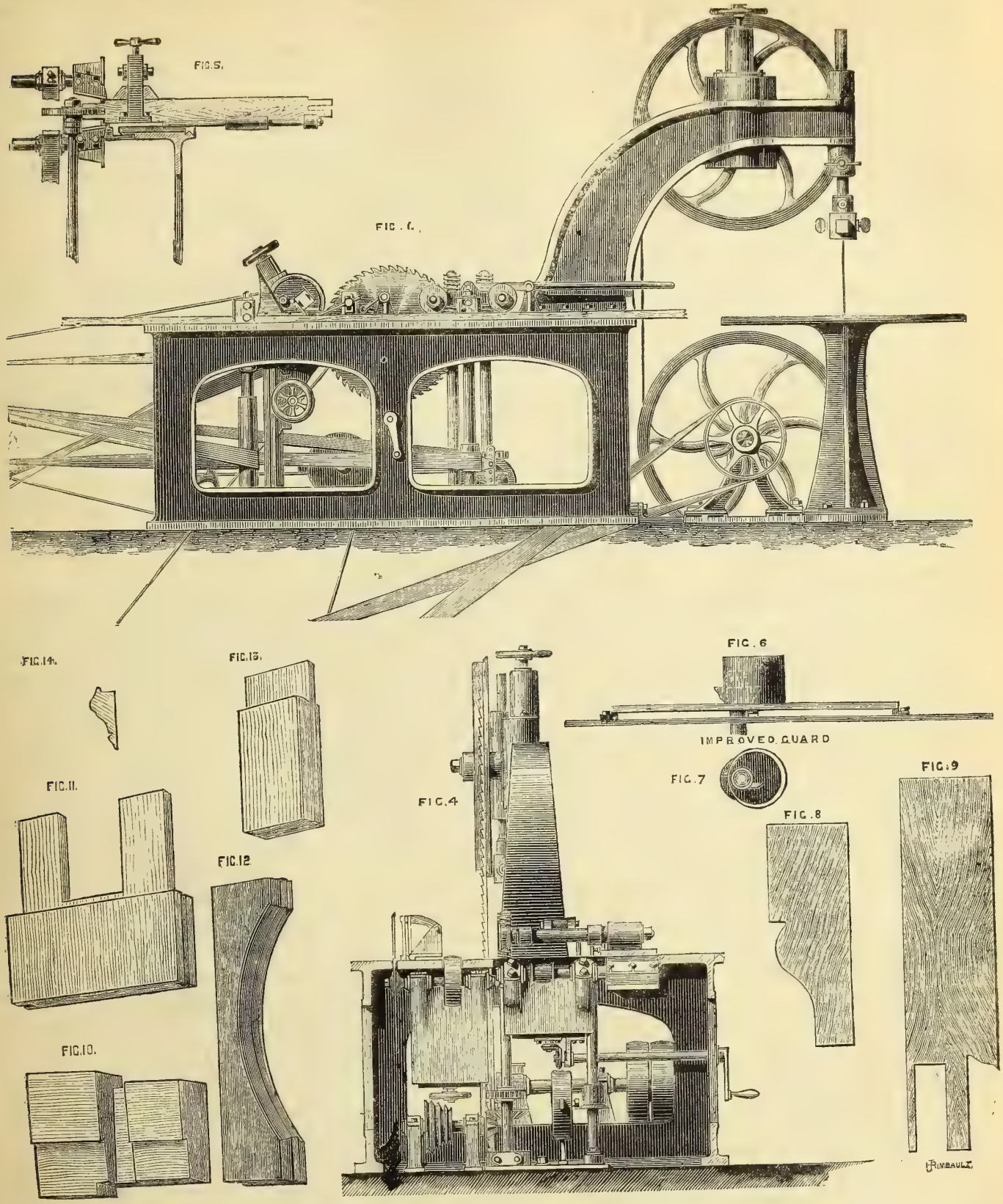
Fig. 6 shows the machine as arranged for planing boards on both sides, and at the same time tongueing and grooving the edges. The board entering the machine on the right hand side is first acted upon by the cutters on one of the vertical spindles, these cutters finishing one edge. It then passes over the cutters which plane the underside, next under the cutters which thickness the board and plane its upper surface, and finally it passes the cutters on the second vertical spindle, which finish its other edge. The feed gear, which can be readily varied to give a rate of feed of from 10 to 20 feet per minute, is of the same general construction as that applied to Messrs. Ransome's general joiner already described; two pairs of feed rollers being, however, employed instead of one. The same arrangement which we have just described as being used for planing is also available for working on all four sides of a moulding at one operation. The moulding shown by Fig. 15, for instance, we have seen turned by this machine, finished on all sides, at the rate of 15ft. per minute.

FIG. 4.



The machine is also capable of turning out curved mouldings such, for instance, as that shown by Fig. 12. For this class of work there is placed upon the table of the machine a false table provided with a circular guard, as shown in the detail views Figs. 6. and 7, this guard encir-

PARKINSON'S "UNIVERSAL" JOINER.



cling the upper end of the vertical spindle which we have mentioned as being adjustable. The guard is provided on one side with an opening through which the moulding cutters can work, as shown in the figures. The piece of wood to be moulded has attached to it a template shaped to the required curve, this template bearing against the guard as the moulding is being cut. The depth of cut taken is, of course, regulated by shifting the spindle horizontally, so that the cutters project more or less through the guard. The whole arrangement is very simple, and answers admirably.

For tenoning, the planing cutters on the horizontal spindles are replaced by tenoning cutters, as in Messrs. Ransome's general joiner already described, while when double tenons are required, the tenon formed by the cutters on the horizontal spindles is subsequently divided by cutters mounted on the adjustable vertical spindle. This arrangement is shown clearly by Fig. 5, which also represents the light sliding table on which the pieces of wood are secured. This table is also used for holding sash bars which have a moulding cut on their ends, as shown in Fig. 8, these bars being clamped down side by side. There is a peculiarity in this sliding table of which we must make mention here. The table has a kind of frame attached to it which serves to support the outer ends of the pieces of wood which are being operated on, and the sides of this frame are formed of bars sliding in sockets, so that the outer bar of the frame can be set to act as a gauge for finishing the pieces to an exact length. Inasmuch, however, as the gauge would be in the way when the first ends of the pieces are being acted upon, it is made so that it can be depressed when the pieces extend over it, it being forced up again by a spring when the pieces are removed.

Besides cutting single and double tenons, the machine will also scribe the shoulders, as shown by Fig. 9, the scribing being effected by merely placing a second set of cutters of the proper form on the vertical spindle, shown in Fig. 5. In ordinary regular work the machine will scribe and double tenon 300 pairs of sashes in twenty-four hours, and the frames for 100 doors have been tenoned by it in a working day of 9½ hours. One of these universal joiners at Messrs. Corbett and McClymont's has also finished on all four sides 1980 ft. of 2in. besides 2680 ft. of 2½in. moulding in the course of a day of 9½ hours, this being done in the regular course of work without any special preparation, and without interfering with the

operations going on at the circular sawing side of the machine, or at the band saw table. Another of the many varieties of work which this machine is capable of performing is shown by Fig. 10, this figure representing the end of a sash sill as shaped wholly by the machine,

Of the two machines which we have described above, each has its special application. Mr. Parkinson's "universal joiner" may be described as a further development of the general joiner, and although a more expensive machine than the latter, the greater variety of work which it is capable of performing will, no doubt, lead to its being adopted in place of the general joiner in many cases. Both the machines are thoroughly well designed and constructed, and we have seen each of them turn out excellent work.

As an instance (says *Engineering*) of the economical results attending the substitution of wood-working machinery for hand labour, we may mention that at Messrs. Corbett and McCymont's saw-mill an amount of work which formerly cost them 442*l.* per month for wages when done by hand is now performed at a cost of 94*l.* The plant employed, which was all erected by Messrs. Allen Ransome and Co., consists of a 42in. selfacting circular saw bench, a 14in. portable deal frame, a large combined planing and moulding machine, a small planing and moulding machine, a hand-mortising machine, a general joiner, and one of Mr. Parkinson's universal joiners. The cost of working this last machine has, since its erection, averaged 50*l.* per month less than would have been paid for wages alone, if the work it performs had been done by hand labour at the ordinary piecework prices.

METROPOLITAN TRAMWAYS.

WE have been favoured with a copy of the report made to the Vestry of S. Pancras by the Chief Surveyor, Mr. Wm. Booth Scott, C.E., on the tramways now in course of introduction on the Metropolitan roads. The report is so lengthy a document that we can but spare space to glance at Mr. Scott's conclusions. They are unmistakeably antagonistic to the present Tramway Companies, who, it is asserted, by being permitted to lay tramways upon public thoroughfares, would be allowed "to usurp a right to control the use of the thoroughfares by the community at large, and would virtually establish a gigantic monopoly of the passenger traffic." The only satisfactory mode of dealing with the matter, according to Mr. Scott, would be by the institution of a corporate body, to be called, say, the Metropolitan Tramway Board, upon whom would devolve the duty of devising, constructing, and managing such comprehensive scheme, and extending it from time to time; or, should this proposition fail to be adopted, that the Tramway Companies should purchase the privilege from the "street authority," as representatives of the community, and further pay over to those authorities a fixed proportion of the profits, say one-half in excess of 5 per cent.

In the case of the first proposition, Mr. Scott asserts that, if the privilege of running cars upon the tramways so constructed were put up to competition and let by tender annually, or for terms of years, upon terms and conditions defined by the Metropolitan Tramway Board, the revenue so derived would not only (rapidly) defray the cost of constructing and maintaining the tramways, but would also produce so large an annual surplus as to reduce the general or paving rate at least one-half over the whole metropolis.

We confess to a lively appreciation of the benefit of a reduction in the paving rate, but at the same time hardly see why the profits of the Tramway Companies should provide the wherewithal for the accomplishment of such an object. It may be a misfortune, but it is nevertheless true, that very few schemes of enterprise or improvement are originated in this country either by central or local governing bodies. All such attempts are left to private enterprise, and—as in the present case—much delay has frequently to be put up with, and much stubborn opposition encountered, before the project so long conceived is fairly put on trial. We have now been waiting something like a dozen years for the introduction of a system of locomotion which it is believed will relieve our streets and ultimately supersede our present vehicles, and now that it has obtained Parliamentary sanction for an experimental trial, we think it rather late in the day to propose to hand over the work to some one else.

PLYMOUTH GUILDHALL, &c.

THE view of the second premiated design for the Guildhall, public offices, and courts of law for Plymouth, which we give to-day, must be considered rather as a diagram to illustrate the general scheme complete in its arrangements with reference to the site and adjoining buildings, rather than an exponent of the architecture itself. The point of sight is necessarily an impossible one, if the arcade which is necessary to unite the two blocks in one harmonious façade towards Westwell-street, as well as to complete the quadrangle, were carried out. But so must be any view taken to exhibit both sides of a wide courtyard. In this case, the fine tower of St. Andrew's Church, *the* church of Plymouth, with its characteristic angle pinnacles, is the central feature, and grouped together in one building. On the northern side, are the public offices, with the Guildhall and various suggested additions, while on the south side (where greater length of site is available) is the great public hall, placed centrally between the assize courts and suggested judges' lodgings eastward, and the police offices and court, with magistrates' rooms, &c., on the west. Both buildings, as before stated, have a long frontage towards Westwell-street, and are intended to be connected by an arcade, or at least a dwarf wall and railings.

Mr. Hayward, in his statement accompanying the design, says:—The harmony of design resulting from the subordination of one part to the other, while each contributes to the general effect of the whole group, will be noticed partly as the effect of adopting a style which, as that of the adjoining church and buildings, recommends itself as the style (*par excellence*) for the particular spot and for this particular purpose. As that which was most peculiarly English at a time when good national architecture was last practised in England, this style of Perpendicular Gothic (modified, of course, to suit modern requirements) has been adopted—and also as a style which was the one best known and everywhere adopted in Devonshire for domestic use and public purposes—notably at Berry Pomeroy, Dartington, Compton Castle, Tor Abbey, Tavistock, Cothele, &c.; as well as old portions of Coldrennick, Werrington, &c., in Cornwall; indeed all 15th and some 16th century buildings.

"The Tower of S. Andrew's Church especially—with which these new buildings are designed to accord—is a fine example of the style referred to, and the adoption of it as a key-note to the general scheme of design is a very happy suggestion in the Instructions, and one the author has found great pleasure in following out."

THE BUILDING NEWS SKETCH-BOOK. No. XVIII.

ROCHESTER CASTLE.

THE venerable remains of this noble fortification are situated on an eminence just above Rochester Bridge, on the bank of the Medway, at the south-west angle of the city. It is generally supposed to be the work of William the Conqueror, and it is highly probable that Odo, Bishop of Bayeux, in Normandy, contributed greatly to this magnificent work, for he was then appointed Chief Justice of England, and Earl of Kent, and resided in Rochester.

The walls of the castle are built with rough stones of very irregular forms, with a cement or mortar containing large quantities of shells, and which has set nearly as hard as the stone itself. The interior of the walls has been rough cast, and in a great many places a considerable portion is still adhering to the surface. The walls are about 104ft. high; their thickness on the east, north, and west sides is 11ft., and on the south it is increased to 13ft.

The castle is about 300ft. square within the walls, and is one of the most interesting specimens of Norman architecture in England. The greatest attraction to the spectator is the noble tower, which stands in the south-east angle of this castle. It is quadrangular in form, having its sides parallel to the walls of the castle.

The foundation of this tower is supposed to have been laid by Gundulph, who was compelled by the King to spend a certain sum of money on this building, in reparation of severe damages caused by a siege of the castle by the King against Odo, who was a turbulent prelate. So Gundulph set to work, and after he had repaired the damages, he laid the foundation for this great tower, which is still called by his name, and has proved through succeeding ages a lasting monument of his fame. This dates about 1090. Gundulph, however, did not live to complete his great and noble work, but died about twelve years after it was begun; but as the plan and foundations were formed and laid by him, it has ever since been known as Gundulph's Tower. It is quadrangular, and about 70ft. square at the base, and the walls average about 12ft. thick. In the partition wall in the centre is a well 2′ 9″ diameter, neatly wrought in the walls, which ascends through all the stories to the top of the tower, and has a communication with every floor, as may be seen in the sketch.

The holes in the walls distinctly mark the position of the floors, though none of the timbers now exist.

The subject of my sketch is one of the walls of the state apartments, and here the workman has shown his greatest skill. These rooms were about 32ft. high, and the wall carried by columns forming four grand arches. These columns are about 18ft. high and 4ft. in diameter.

Considering how long this noble pile has been left exposed to the merciless hands of time and weather, I believe there are few buildings in England of equal antiquity in a more perfect condition. The skill and ingenuity displayed in this grand work must strike the eye of every beholder with awe and admiration, and no one who has any taste for ancient architecture or antiquities can spend an hour more agreeably than in surveying this highly interesting and magnificent building. EDWARD SKERRITT.

BLOOMSBURY FEMALE SCHOOL OF ART.

ON Wednesday the annual meeting for the distribution of prizes to the members of this well-known School of Art was held in the theatre of the South Kensington Musum, under the presidency of Sir Stafford Northcote. From a statement read by Mr. Valpy respecting the work of the institution, it appeared that the present number of students on the books were 122, while at the close of the summer session the number was 141. On the 21st and 22nd of December, 1868, the annual exhibition of students' works was held at Queen-square, and was visited by 593 persons. At the annual third grade examination, held in February last at South Kensington, ten students presented themselves from this school; of this number five obtained full certificates for the first group. Their names were Martha Clarke, Ellen Hancock, Alice Blanche Ellis, Ellen O. Wheeler Smith, and Blanche Macarthur. At the second grade local examination, held at the school on the 9th and 10th of March, 61 students presented themselves; of these 53 passed in one or more subjects, 23 obtained prizes (having had the mark "excellent" for one or more of their papers), and ten obtained certificates of the second grade. Ninety-nine students sent up, on the 9th of April, a total of 1332 elementary and 319 advanced works, in competition for National Prizes and the Queen's Gold Medal. Eleven third grade prizes were awarded in the elementary section, and 12 prizes in the advanced section, making a total of 23 prize drawings. The Queen's gold medal had been won by Julia Pocock, and Her Majesty had been graciously pleased to purchase one of her water-colour drawings, "A Head from the Life." The National Silver Medal had been awarded to Mary Whiteman Webb for studies of flowers from nature. National Queen's Prizes, consisting of books, had also been awarded to Julia Pocock for studies of the figure, to Mary Whiteman Webb for flowers from nature, to Alice Blanche Ellis for flowers from nature, to Emily Slous for a modelled hand from nature, and to Aimée Messenger for a botanical sheet. Julia Pocock had taken the five guineas offered by Mr. Alexander Macarthur for the best modelled hand from nature. Ellen Macrae and Sarah M'Gregor gained the two prizes for designs for folding screens given by Messrs. Turner and Sons. Catherine Banks and Sarah M'Gregor had been pupil-teachers for the past year. Sarah M'Gregor had been transferred to the training class at South Kensington, and Mary Whiteman Webb had been appointed pupil teacher in her place. The committee were again happy in being able to state that the school was free from all debt. The Committee of Council on Education awarded in August last 39 bonuses among the head masters and mistresses of the 99 Schools of Art in connection with the

Science and Art Department, being one sum of £50, three sums of £40 each, four sums of £30, ten sums of £20, and twenty sums of £10. Out of the 39 teachers thus distinguished the committee were gratified to find the name of Miss Gann, the head mistress of the school, third on the list. And the committee could not but recognise also that on her able general management and efficient administration the prosperity of the establishment mainly depended. The committee considered that the school had this year been decidedly stronger in the higher branches of art; they wished they could add in that also of design. Julia Pocock, in the advanced stages of the figure, and Mary Whiteman Webb, in studies of flowers from nature, deserved the highest commendation; Ellen Macrae with Emily Slous in modelling, and Charlotte Maria Noble in the elementary stages of the figure, merited honourable mention. Alice Locke, Alice Blanche Ellis, Martha Clarke, Ellen Hancock, Emily Hentsch, and Eleanor Manly gave promise of following the good example set them.

The prizes, which were very numerous, were then distributed. The Queen's Gold Medal was given last, Miss Pocock being the winner.

Sir DIGBY WYATT made a short address, and Mr. COLE, Professor DONALDSON, and Mr. GODWIN addressed the meeting, which terminated with a vote of thanks to the chairman for presiding.

NOTES ON SOME OF THE TIMBER BUILDINGS IN ENGLAND DURING THE MIDDLE AGES.*

BY CHARLES BAILY.

IN many cases the angle-posts are very richly carved. There is a very good example at Petworth, in Sussex, and another at the "New Inn," Gloucester; but one of the most elaborate is, or was, at Bury S. Edmund's, in Suffolk: it belonged to a house just outside of the place where the East Gate formerly stood. The base and the curved bracket at the top were carved with elaborate flowing tracery, and above the pedestal was a figure of a "Salvage Man" holding a club. This figure, clothed in a sort of plaited dress fitting tightly to the body, was probably intended for a masker in the character of a wild man, a favourite character in the Middle Ages, and the plaited dress possibly was intended to represent hair.

The projecting ends of the joists, when left in view, were generally rounded on the undersides; sometimes, however, these were moulded, and at other times were covered by a long facia board, either moulded, with the upper part cut into small battlements, or carved with foliage, and sometimes with a cove executed in plaster underneath the joists. The ends of the joists carried another wooden sill, which received the quarters of the framing of the upper stories.

Not only the floors, but also the roofs of the old houses overhang considerably, particularly at the gabled ends, where the outside rafters, technically called barge-boards, or verge-boards, are very much larger than the others, and are moulded and cut with tracery, or carved in foliage, with all the skill that the Middle Age workman could bestow upon them: a charming effect is thus added to the exterior of the house. These barge-boards are carried by the plates and purlins, the ends of which pass through the boards, and are pinned. Very often, and particularly as regards the later examples, the projecting ends of the plates are supported by carved brackets; and resting on the tops of the plates is a moulded or carved timber breastsummer, which receives the lower ends of the timbers of the projecting gable. There are yet remaining numerous examples of the barge-boards and gables in all those counties of England where timber was once plentiful.

Thomas Scotte, of Hawkhurst, gentleman, in his last will, dated May 8th, A.D. 1533, provides for the finishing of his timber house:—

"I will that if all my goods and chattels moveable be not sufficient, that then my executors furnish out of the rents and profits of all my lands, except such as are devised to Mildred my wife, to build, set up, and finish my house, which now lyeth in frame at Congchurst."

As respects the materials used for the covering of the roofs, as the roads were bad and carriage costly, it very much depended upon what the immediate neighbourhood produced. Many buildings of the humble class were thatched with straw, or with reeds if procurable. Throughout the county of Kent tiles of burnt earth were used, but in the lower parts of Surrey, and in Sussex, thin flakes of a stone, easily cleaved, known by the name of Horsham slates, were very generally adopted, and are still found on many of the old buildings; indeed, the roof over the hall at Crowhurst-place is so covered; these make an excellent covering when carefully and properly laid, but the timbering of the roof requires to be very substantial, on account of the great weight of the stones. Another material was shingles, or square pieces of the heart of oak, each about one foot long by four or six inches wide, and half an inch thick; these are fastened on to rough boards with wooden pegs.

The roof of the great hall at Battle Abbey was originally covered with shingles; and at the "Mote" House at Ightham, a part of the roof over the hall is still so laid, although a more modern roof has been erected over it. Shingles, however, appear to have been disused as a covering for the roofs of houses as early as the middle of the fourteenth century, probably because the slope of the rafters required to be so very steep; for in letters patent, granted by King Edward II., in A.D. 1314. to his mother-in-law Margaret, queen dowager of England, we learn that "the king had been informed that divers manor houses and castles which she held in dower, and which were roofed with wooden shingles, were greatly in need of repair, and that they might be roofed at a less cost with slates, stone, or earthen tiles than with such wooden shingles; he therefore grants her permission to unroof those houses which needed repair and to cover them with slate or tile, and at the same time leave to cut down and sell as many oaks and other trees in the woods of the manors and castles aforesaid as may suffice to repay the reasonable expenses incurred by her for new roofing the houses in question."

In later times, shingles have been used only as a covering for the slopes of the timber spires of the churches, so common in Surrey, Sussex, and in Kent.

The chimney-shafts of the old houses are among the chief external ornaments, and it matters not whether the material is of stone or brick. In most cases a large amount of ornament and nice execution is bestowed thereon; of stone some few examples of so early a date as the thirteenth and fourteenth centuries are still to be found. We may refer to one at Abingdon Abbey, in Berkshire, and to those at Old Woodstock and Burford, in Oxfordshire; also to that at Northborough Manor House, in Northamptonshire, as specimens of interest. But in many of the manor houses in Norfolk and Suffolk, and at Hampton Court Palace, in Middlesex, some of the shafts executed in red brickwork are of truly marvellous workmanship. We give on next page a view of two from an old house at Little Braxted, in Essex. In the county of Surrey there are some rich shafts at Beddington Manor House, and many of a plainer character at Archbishop Abbot's Hospital, at Guildford. In the plan the shafts are generally either circular, octagonal, or square, placed on the diagonal, several being clustered together in one stack, with narrow spaces between the shafts. The generality, however, of the Surrey and Sussex houses of the sixteenth and seventeenth centuries have plain chimney-shafts, which are rendered sightly and picturesque by the shafts being broken in the plan and having a series of oversailing courses worked round the tops. There are examples at Shere, near Guildford. The date on one, 1620, very probably gives the age of the others.

Some writers upon the subject of the domestic architecture of England in the middle ages have stated that fireplaces were then but few in number; but a careful examination of the old buildings will at once show that these were more numerous than has been supposed. At Conway Castle, in North Wales, there is one in nearly every apartment; at Bodiam Castle, in Sussex, there are between 40 and 50 now remaining.

In one of the upper rooms at the George and Dragon inn, at Ightham, an old timber house of the time of Henry VIII., is a chimney opening with plainly chamfered jambs, and having a raised hearth of tiles, with a fixed fender of stone in front, and all as old as the house itself.

The art of staircase building was not commonly understood in this country until the beginning of the seventeenth century; previously to that time the stairs were either contained within a turret and wound round a centre newel, or formed a steep approach between partitions, as at Crowhurst Place. But in stone buildings the stairs were very often formed in the thickness of the walls, as we see at Hever Castle, in Kent, and at the Guildhall of the City of London. One chief characteristic of an ancient Gothic staircase is that the steps are formed of solid blocks, and we find one so constructed leading from the "Entrye" to the upper rooms at Crowhurst Place; it has a short portion of the original massive handrail of oak still attached to the side.

Of turret staircases in timber houses we have fine examples at Boar Place, near Penshurst; and at a house formerly "*my Lord Chancellor's lodgings*," attached to the Royal Palace at Eltham, in Kent. At Eastbury Hall, near Barking, in Essex, a very fine old house, built probably by Clement Sysley, who purchased the estate A.D. 1557, of John Keele, some time during the latter half of the sixteenth century, and where the walls are entirely constructed of bricks without stone dressings of any kind, there were two staircases of large size, contained in turrets: one of these has been destroyed, the other remains in a perfect state. The solid oak steps wind round a circular newel, also of oak, which measures 11in. in diameter, and into which the narrow ends of the steps are tenoned and pinned; each step has its front lower edge rebated over the back of the step below it, the under soffits being worked off into a fair slope. The steps rise from 7½in. to 8in., and the treads next the walls, to which they are but slightly fixed, measure 18in. wide, and next to the newel, 2in. wide. This staircase measures in the going between the newel and the wall 4ft. 5in. wide, and the brick enclosing walls are 2ft. 8in. thick. The turret in the plan is circular internally, but on the outside it is multangular.

In the remaining walls of the destroyed turret we see the handrail, entirely formed of moulded brickwork, with great ingenuity, of two courses of bricks on edge, with a course laid flatwise between.

Sometimes we meet with examples of external staircases, and in such cases we soon discover some reason for such an arrangement. There is a good example at an outbuilding belonging to the Archbishop's palace at Maidstone, Kent. The close parapet of stone under the handrail is corbelled out on a stone foundation, and the stairs are covered with a wooden penthouse roof, supported on posts which have had tracery between. The building to which this staircase belongs is two stories high: the lower floor being the stables, and the upper was in all probability a store for corn, or a granary.

There is another external staircase constructed of timber, with a roof over it, on the east side of the hall of the Abbot's house at Westminster, now the dining-hall of the king's scholars of Westminster School. This staircase is not of so old a date as the hall to which it is an approach. The hall was built in the reign of King Richard II., by Abbot Nicholas Litlington. The present staircase, perhaps replaced one of older date, or it may have been added when the school was founded by the king after the dissolution of the monastery, and the reason of placing it on the outside was to obviate the necessity of the scholars passing through the house.

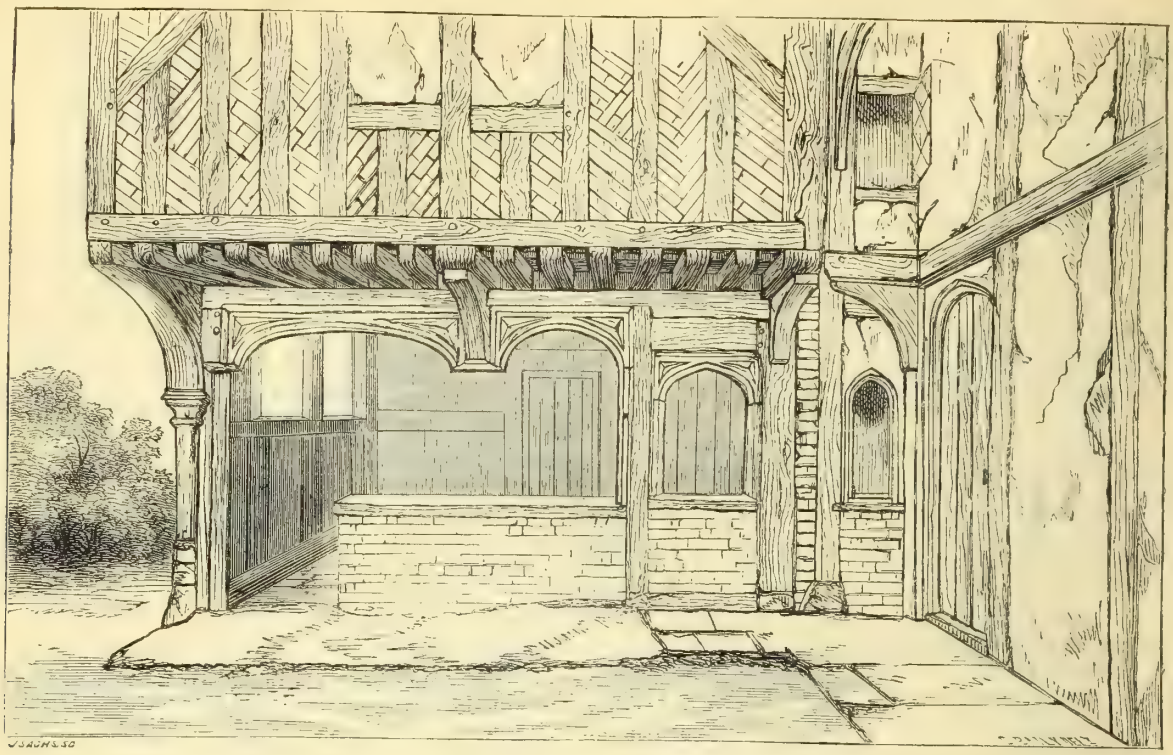
In the village of Lingfield, in Surrey, are several timber-built houses, every one of which is worthy of the most careful examination and attentive study. Two of these houses in particular illustrate very fully the features of the construction referred to. One of these houses stands on the north side of the churchyard, and belongs to a more humble class of dwellings than Crowhurst Place; but, nevertheless, it was formerly a house of some importance. In the external design we still see the recess in the centre of the front, with the projecting side wings and the overhanging stories; but in this case the side projections are not gabled, the roof being carried straight over the whole of the building in one continued span. The curved braces, one of which now alone remains, from the side projections to support the plate of the roof, is a feature which is very common to this class of house.

The other house at Lingfield which has been alluded to is situate in the village street nearly opposite to the Star Inn. Like the example last mentioned, it has the central recess, with the braces to support the roof-plate; and this house is a most valuable example, inasmuch as one part of of its ground story was evidently built for a shop, and to which use it has always remained.

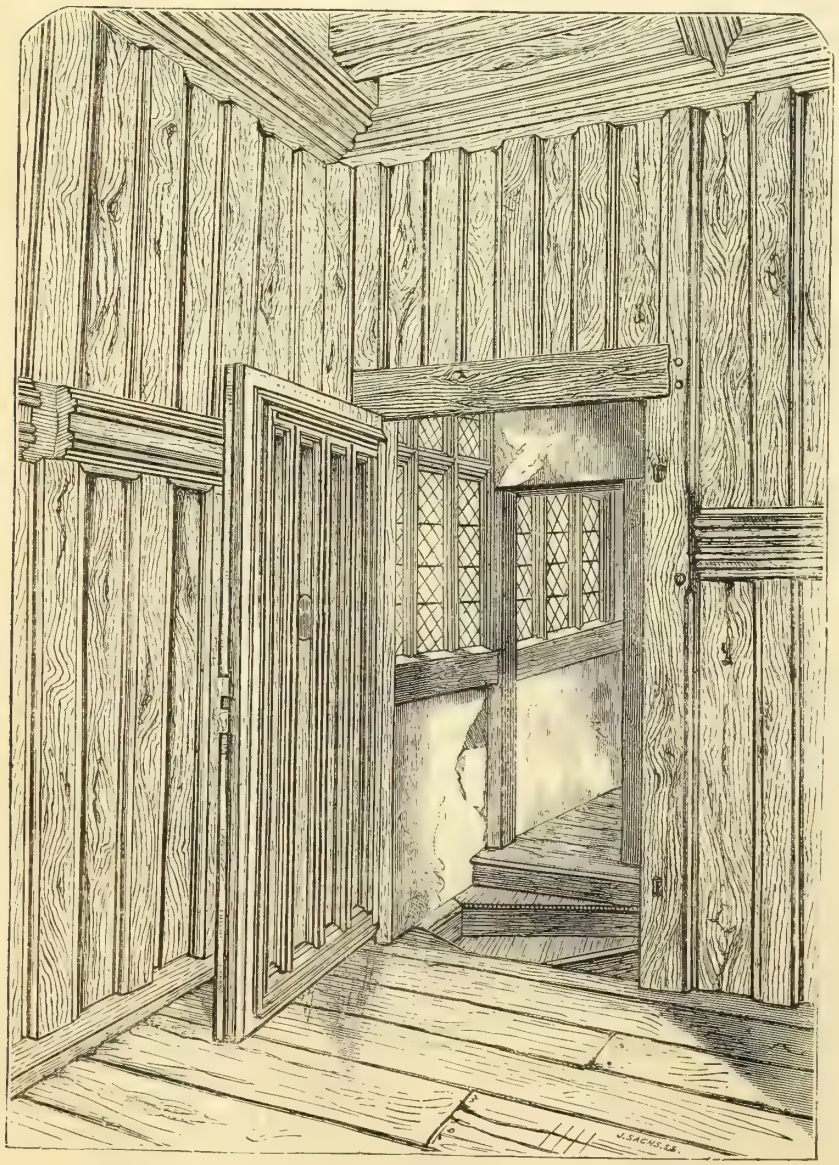
Two arches formed the open shop front; these do not seem to have been at any time glazed, but were most probably enclosed with wooden shutters

* Read before the Architectural Association, January 14, 1870.—(Continued from page 98.)

TIMBER BUILDINGS OF THE MIDDLE AGES.—(See page 109.)



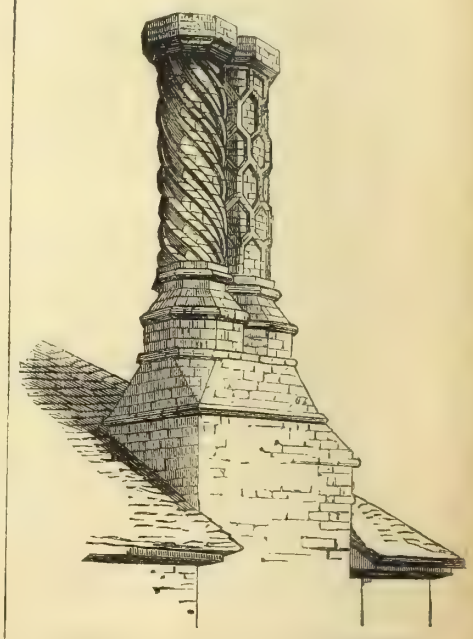
SHOP AT LINGFIELD, SURREY.



STAIRS AS SEEN FROM THE UPPER STORY, CROWHURST PLACE.

hinged at the bottom to the sills, on the tops of the stall-boards, and which could be turned down in the daytime at right angles with the front, and used for the display of wares. The other arched opening is the original door of entrance.

The corner and intermediate upright posts, with their projecting brackets, and the ends of the girders and joists, standing out and supporting the upright quartered sides of the upper story, with the spaces between in this case not plastered, but



CHIMNEY SHAFT AT LITTLE BRAXTED.

nogged up with bricks placed in a variety of forms, are here all plainly to be seen; and in the interior of the same shop we see the diagonal dragon-beam with the joists, the ends of which are framed into it, and lie at right angles with each other, as before stated, in all those houses where the over-sailing or jetty story continues round the angle of the building. These two houses are both of the same date, and must have been erected about A.D. 1520.

(To be continued.)

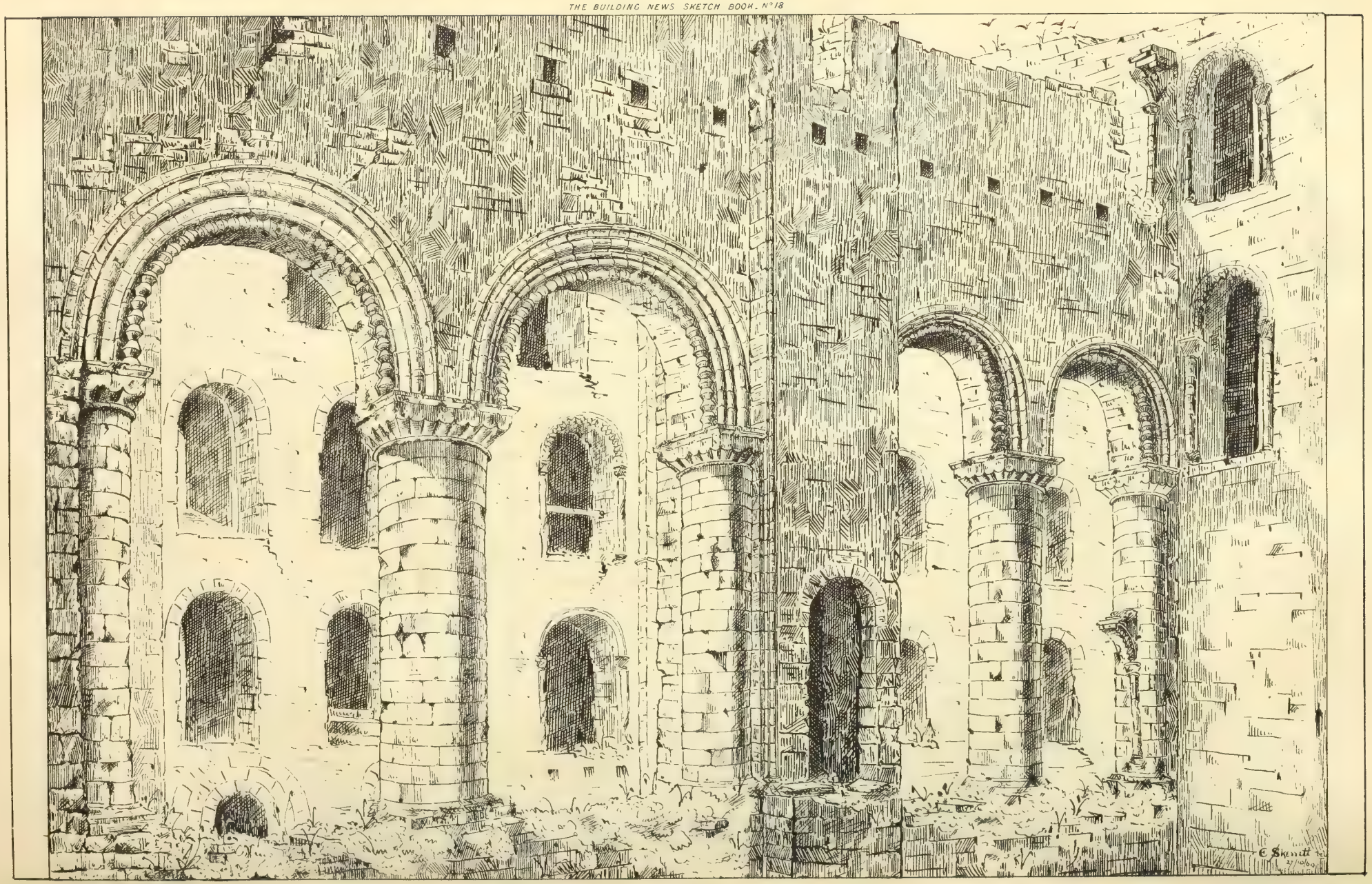


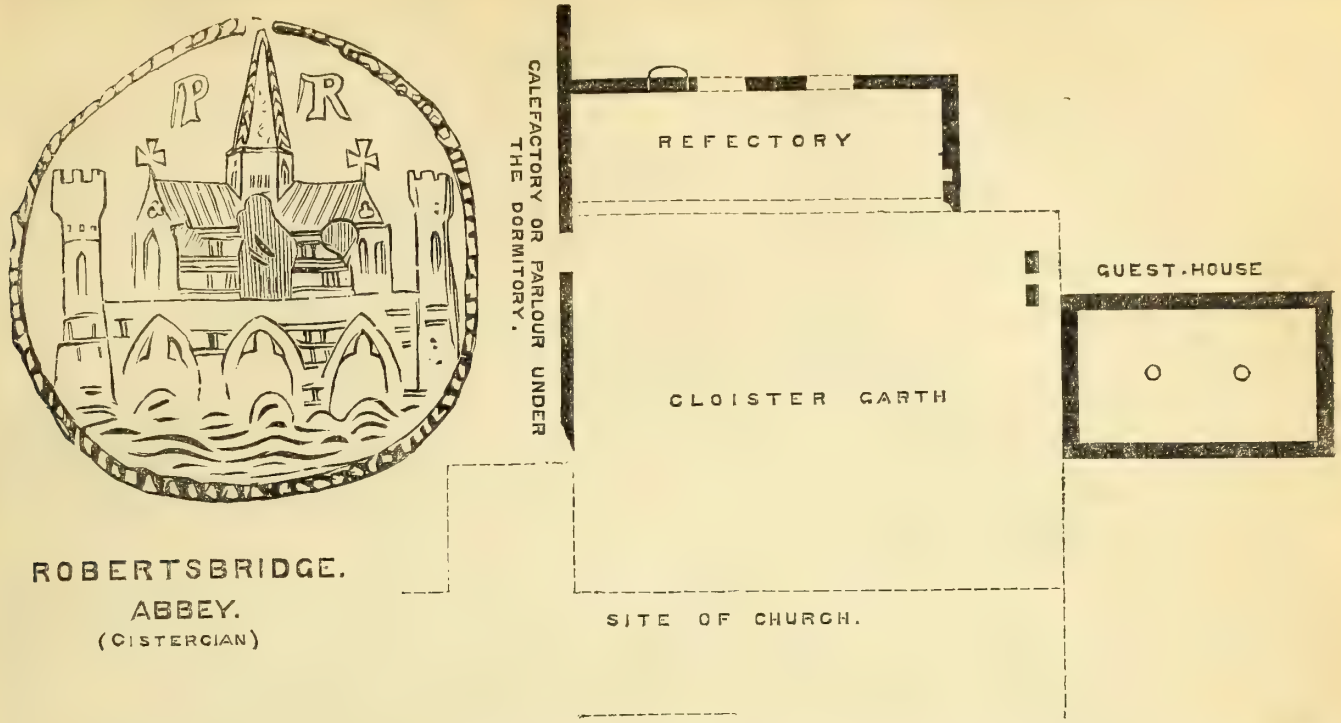
Photo-lithographed by Whitehead & Bro. London.

SKETCH. IN THE INTERIOR OF ROCHESTER CASTLE - KENT.

Plymouth Guildhall, Public Offices & Courts of Law — Second premiated Design — Chas. F. Hayward F.S.A. Architect 1869

Printed by Waterlow & Sons

The Premiated Plans Feby 11th 1870



ROBERTSBRIDGE.

ABBEY.

(CISTERCIAN)

ROBERTSBRIDGE ABBEY.

PROFESSOR AIRY fixes at Robertsbridge the battle Cæsar after his second landing fought with the Britons, as one of the most remarkable military stations in Sussex. (Archæol., xxxiv., 244.) Robert de S. Martin founded a Cistercian abbey here in 1176, and Alice, daughter of William de Albini, third Earl of Sussex, widow of John, Earl d'Eu, and wife of Alured de S. Martin, gave Snargate Marsh to the monks. Henry, her son, gave the lordship of Worth, with the valley adjoining to the forest of Brightling, and his brother John added the lordships of Maplesdene and Cunbdene. Henry Earl d'Eu likewise gave the Prebend of Salehurst and Udimore—(Reg. Storey P. II., fo. lxiv.)—in Hastings College, to the Abbey, with the lordship of Waste; it conveyed the churches of Salehurst, Mountfield, and Edymere, land and tithes at Somerville, Mountfield, Hegea, Boreham, Maseland, Gertselle, and Salenta. In 1249 William de Echingham appropriated it to the Abbey. It was a daughter of Boxley Abbey, founded forty-three years before—(Ann. Waverl. 230)—and affiliated to Clairvaulx, and according to the "Chronicle" of Rochester, in 1176 Robert de S. Martin founded the Abbey on the river Rother; but the charter of Richard I.—(Monasticon V. 667.)—calls Alured de S. Martin the founder; his only claim to the distinction being the benevolence of his wife, who in another charter is called foundress.

By an easy corruption, Robertsbridge has been converted into Rotherbridge by Leland, Lambard, Somner, and Camden, as if the river gave name to the bridge; but the ancient name of the stream was Limine, and Rother, meaning cattle—(21 Jac. c. xxvii., Cowel Interpr. s. v.)—would have given name to the bridge, as at Cowbridge and Oxenbridge; and Redlands, an adjacent farm, might thus be a corruption of Rother-lands, as Redriffe is of Rotherhithe. But the name Robertsbridge occurs on the Conventual Seal in King Richard's Charter, in Henry III.'s grant of a fair—(Cl. Ro. 9, Hen. III., m. 22.)—in writs of Parliament 25 Edw. I., in a charter of Thomas de Etchingham—(Add. M.S. B.M. 6351, fo. 39)—and in Patent Rolls—(10 Edward III., p. 2, m. 15, in dorso, and 14 Edw. II., p. 2, m. 5, in dorso); and besides these evidences we find a William of Robertsbridge, a justice itinerant in the forests of Wilts, 6 Edward III. —(Ryley Placit. Parl. App. 652)—and Walter of Robertsbridge in 16, Edw. I—(Prynne's Records III., 1293.) Dugdale, in his History of "Imbanking" calls the river, as far as Bodiam, Robertsbridge Bay.

There was a sacred well called S. Catherine's near the George Inn, and a few tiles have been noticed by Sir W. Burrell—(Add. M.S. 6344, fo. 163, b.)

[1]Abbas, [2]Radci, [3]cis-de, [4]Laur, [5]obsec, [6]e, [7]a sceptre, with two birds standing on it facing each other, [8]Chequey, or, and gules, a chevron ermines, [9] Barry of six arg. and gules; on a chief gules three scollopshells arg., [10] a fleur delys, [11]a greyhound, [12] a hare, a hawk, [14]a quatrefoil in a circle, [15]a branching tree, etc. In the solar of the Guest House tiles remain with the arms of Warrenne, birds, fishes, and hounds.

There is one other relic of the abbey mentioned by Dr. Maitland in his "Dark Ages" at the Bodleian Library at Oxford, with this inscription: "This book belongs to S. Mary of Robertsbridge, and whosoever shall steal it or sell it, or in way alienate it from this house or mutilate it, let him be anathema maranatha." In 1327 a Bishop of Exeter, finding himself the possessor, meekly adds—"I, John, Bishop of Exeter, know not where the aforesaid house is, nor did I steal this book, but acquired it in a lawful way."

The abbey was surrendered by the abbot and eight monks. The conventual buildings have almost shared the same fate as the minster of S. Mary. All that has been spared consists of a ruinous portion of the Refectory which measured 86ft. by 26ft., on the south side of the cloister garth, and a building comprising a solar over a vaulted substructure on the west side. Against the eastern wall of the Refectory in the part now used as an oast house, are a doorway, and springers of the vaulted chamber which formed the calefactory or common room over which the dormitory extended. The western wall exhibits three arches which communicated with the batteries, southward of which is a large sewer. In the south wall there is a doorway which led to the kitchen, and three window cases may be traced, while a slight projection in the wall and a fire-place within mark the site of the reader's pulpit and its staircase.

The Guest House, detached about 55ft. westward from the cloister garth, contains a fine cellarage of three bays, and two alleys measuring 49ft. by 22ft., and 8ft. 7in. in height, with quadripartite vaulting, and two round pillars 4ft. high. In the north wall there is a single window, and the west wall is pierced with two others having shouldered-arch heads. Stairs supported upon a bridging arch lead to the upper room or solar, which has on the west wall a trefoiled aumbry, with nook shafts, and on the exterior a window arch with shafts and indication of trefoiled tracery. In the north wall are two restored arches with curiously carved brackets. Two window arches occupy the east wall, which retains portions of a buttress. In the south wall, adjoining the stairs, there is a pointed doorway near another in an outer eastern wall.

ABBOTS.

Dionysius (Add. MS., B.M., 6344, fo. 46.)

WILLIAM.—He, in 1192, with the Abbot of Boxley, as lords justices, went into Germany to find King Richard's Prison, and found him at Oxefer, in Bavaria. They were present at the meeting with the Emperor on Maundy Thursday, 1193. (Hoveden, s.a., ap., Saville, p. 722.) He joined with the Abbots of Rievalle, Ford, Boxley, Stratford, Stanley, and Basingwerk in a letter desiring the Pope not to permit the destruction of S. Thomas's Church, founded by Archbishop Baldwin. The letter is dated 1198, (Epist. Cantuar, ccccixii. 423, Gervase, c. 1612.) He and the Abbot of Boxley were Archbishop Hubert's envoys to Rome. (Ib. ccccxcviii., 459). Simon son of Wm. D'Avranches and Cecilia, his wife, in 1216, sold the manor of Sutton by Seaford to the Abbey, in order to raise funds to pay the ransom for her father who had been in arms against the King.

The Abbey held in 1221 two knights' fees in Sutton, the gift of Henry III., to whom they had been forfeited (Pa. Ro. 5, Hen. III).

1222.—NICHOLAS (Campbell Charters xxvii., 2 Add., M.S. 5706, fo. iii. b.)

JOHN, with W., Abbot of Boxley, wrote a letter on foreign affairs to Hubert de Burgh, Justiciar, in June, 1224. (Royal Letters, cc. 227.)

1225.—ALAN (Campbell Charters, xxvi., 2021.) On June 9, 1254, Henry III. granted a market on Mondays, a fair for three days at the Exaltation of Holy Cross, and free warren in their domains in Kent and Sussex outside forest grounds.

WALTER.—On November 22, 1295, the Abbey received the King.

THOMAS.—On August 8, 1297, the King was here again.

LAURENCE.—He consented to the assign-

ment of 100 marks a year for the support of two clerks to cense the Host at the elevation daily at the high altar of Chichester Cathedral in time of high mass, 1304. (Mun., of Chichester, lib. v., fo. xvii.)

ROBERT.—The King borrowed £40 in 1315, from the abbey, for his Scottish wars. (Rymer, Fred. III., 153; Writs of Parl. II., 88.) He had letters to go beyond sea, 1316, Pa. Ro. 9 Edw. II., P. I.M.S. Harl., 6968, fo. 116, b.

ALAN.—On August 27, 1324, the King was here, and Rudham Cheese came, from Norfolk, and two oxen were slain for his entertainment.

C. 1334.—JOHN (Campbell Charters xxvi. 13, Add. M.S. 5706, fo. 101 b.)

C. 1400.—DIONYSIUS.

JOHN.—Some years since the effigy of a Knight of the 15th century was found here and removed to London by the Earl of Chichester, who supposed it to represent his ancestor, but the arms on the breast of the figure were those of Dalyngrygge, of Bodiam. A William de Bodiam was buried here in the 12th century. Sir John Pelham, a great benefactor to Warbleton Priory, was buried here by his desire in 1429.

1442.—WILLIAM BATAYLLE, probably a native of Battle (Reg. Praty, fo. 67).

1491.—JOHN GODEWINE received benediction Nov. 11 (Reg. Storey, fo. 91 c. Cole MS. xxvii., fo. 93 c). He, with three monks and five yeomen, was charged with a forcible entry into Godard Oxenbrige's house at North Bridge, with sword and staff and knife, and then obstructing the course of a rivulet (Add. MS. 6351, fo. 39).

1528.—THOMAS TAYLLER, in 1528, leased the Manor of Posyngworth to William Palmer, of Frampfylde, and of the King's Guard (Thorpe 139). On April 16, 29 Hen. VIII., he surrendered the Abbey, with Robert Thurgood, Stephen Warre, William Squyre, John Wyke, Laurence Thraver, Thomas Spratt, William Senden, and Robert Copar (Dep. Keeper's VIII. Report, App. II., p. 39). He, in 1558, was in the receipt of his pension of £50; Senden of £6 13s. 4d.; Spratt of £8; Thraver of £6; and Cowper of £4 a year. (Willis's Mitred Abbeys, II., 238.) The gross income was £272 9s. 8d., and the clear £248 10s. 6d. In Pope Nicholas' taxation in 1291 it was £109 4s. 2d.

The site was granted to Sir William Sidney. It passed from the Earls of Leicester in 1726, when John Sambrooke became the purchaser. It was disposed of Sir Thomas Webster, Bart. (Thorpe, 143), and is now the property of Mr. Allfrey. The endowment of Robertsbridge:—

Playden Parish, rents.
Westpelmed, lands.
Udyam Manor or tenement.
Blackstocke, lands.
Wymbelcotts, ditto.
Wadell's, ditto.
Sprytt's, ditto.
Werd Manor (Worth in Brightling).
Wynhamford Mill (in Brightling).
Posyngworth Manor (in Waldron).
Fullyng myll fyldes.
Redd londs in Salehurst.
Coblands, lands.
Popesthurst, ditto (in Salehurst and Mountfield.
Keteneste, ditto.
Badlonde, ditto.
Andrewas, ditto.
Fryars' land in Snare Parish.
Kent. Monken lands in Romney.
Marshe in Warehorne.
Stone, marsh.
Sussex. le Fother Manor, Le Fother Marsh (in Beckley), and Salt Marsh.
Guildeford marsh lands.
Poplysham lands (in Bexhill).
Madersham Farm (in Beckley).
Lands called Derne.
Chytyngle (held by the Abbot in 1334).
Plazdon Parish marsh lands.
Field lands in Selsecombe and Ewerst.
Lands called Rownden in Brightlyng.
Flecherfields lands.
Glynne lands in Salehurst and Mundefelde.
Sutton Manor.
Salehurste Rectory.
Adymer ditto.
Moundefelde ditto (Mountfield).
Woderoffe Manor (in Ebeney).
Marsh lands in Pette, Farlegh, Gestlying, Ikelisham.
Lamberhuste Manor.
Rents in Mapysden, Osyndon, Little Osyndon, Fokysbroke, Ukley, Camden.

The Seal of the Abbey remains attached to the deed of surrender in the Public Record Office. It represents a bridge of three trefoiled arches, with the river rushing through them, and two round turrets, battlemented, and with loops, one at either end. In the background is a cruciform church, with the eastern and western fronts displayed; each has a trefoiled window in the gable, over a single window to the east, and a couplet on the west; the gables have crosses. The north front of the transept has been worn smooth. From the crossing rises a low octagonal tower, with windows in each face, and crowned by a shingled spire. The letters P and R represents Pons Roberti. The legend was, "Hec presens cella Domus est de Matre puella. S (igillum) Coe (commune) Abbatis et Conventus de Ponte Rob'ti." On the reverse is the Coronation of the Virgin, and at the foot an abbot with a staff, standing between two double-handed chalices.

In the Cistercian church the architectural choir formed the sanctuary; the monks sat westward of the crossing, which was left free for access to the transeptal chapels, and were divided from the conversi by a parclose (clausura), who sat at the west end of the nave. (Martene Anecd., p. 1272.) A triforium, which occurs at Byland and Rievalle, was a rare feature. The belfries were to be of wood and plain (ibid 1247, 1445) and contained a bell not to exceed 50lbs. in weight. (Ibid 1247-8.) The entire building was to be rigidly plain; copes were not to be used in it; pictures, carvings, and colour (ibid 1353, 1371, 1372, 1395, 1400), and stained glass (ibid 1254) tesselated pavements (ibid 1322), and many lights (ibid 1433) were proscribed (Harl. MS. 3708, f. 18.) They were forbidden to have a baptistery (de ant. mon. rit. tom. I. 6). Their music was grave and simple, two lights only burned upon the altar, and a lamp was kept constantly lighted in the middle of the choir. Two others, one at the Presbytery step, and another in the aisle or retro-choir were lighted at certain times. No person was suffered to be buried in the church. As regards beauty of internal decoration, we have probably not lost much by the total destruction of the minster at Robertsbridge, unless, like Meaux at a later date, it admitted organs, pictures, rich carvings, images, and painted ceilings; whilst in many minsters of the Benedictines and Austin Canons, the service of God has been maintained without intermission, there is not a church of any other order which is not now utterly ruinous. The torso of Hulm Cultram can scarcely be quoted against this assertion, and Scarborough was a foreign cell, planted in defiance of Cistercian rule, also in a town. The selfish isolation of the Cistercians accounts for the fact in their case; their monasteries were built only on "sites severed from all conversation and habitations of men" (MS. Harl. 3708, f. 18), and when the monks left them, they stood in a wild; hence their destruction. They had neither gold nor silver, but were rich in wool and flocks (Gale, vii., 64); they had no law books in their aumbries, the canons and decretals of Gratian being kept apart. (Martene Anecd. 1263.) In 1239, to avoid popular scorn, they established schools in the universities (Matt. Par., p. 665), and in 1460 had schools of grammar, logic, physics, and theology in their cloisters. (Martene Anecd., p. 1623.) They were in religion Puritans, in diet vegetarians, in calling farm labourers, silentiaries, using a complex code of manual signs instead of their voices, and solitaires amongst men.

At Robertsbridge they made an agreement with the Abbey of Bayham that neither house should build a cell within four leagues of the other. The original number of monks was required to be not less than twelve with an Abbot. (Harl. MS. 3708, c. 1.) Their dress was white, and their hood doubled (Martene Anecd. 1591); their camisia or shirt of linen, (1617), their cowl, like their scapular, white (1431), out of choir, at night, grey (1435), and in the street black, 1646. Furs and almuces (1430), and dyed stuffs (1253) were proscribed; their gloves were without fingers (1251), they bathed once a month (1265-1298), and they were forbidden litters or carriages (1482.) They eat but once in the day, besides taking mixtum (Dist. xiii. c. 1, MS. Harl. 3708, f. 77) but latterly there were two meals, and the rule in vestments, plate, and furniture was modified, as appears by the inventories made at the dissolution.

Let us pass a day among the White Monks. At daybreak the clock strikes and the sacristan rings the bells, all rise in the dormitory, and file into church or sit in the cloister, until the signal for service, whilst the cooks supply water for washing in the lavatory and for drinking in the hall.

They enter at the upper end of the choir, except the sub-Prior and the officers, and those who sit next the Abbot and Prior. Novices occupy a special place. Each sits on his misericord in his stall after having bowed upon the form or desk before him. Matins and lauds for the dead are said (Matin Mass was sung on certain days); to this succeeds Prime, followed by High or Conventual Mass, then comes Tierce, followed by Chapter, which lasts until nearly Sexts, in winter, and then they go out to labour under the eye of a Custos operis, and return to keep Sexts and take the mixtum, a modest breakfast of bread and water.

The mixtum was taken before Sexts (c. lxxiii. xci.) In summer, *i.e.*, from Easter to Nov. 1, after Chapter, was labour, followed by confessions in chapter to the Prior, and then succeeded a slight interval for private prayer or reading. Tierce followed, and then Mass; if it rained the monks read instead of doing labour. After Mass they sat in cloister till Sexts. In harvest time Mass succeeded Chapter. Dinner was usually between Tierce and Sexts (cxix.), but sometimes after Sexts (cxviii). No guest was ever admitted into the Refectory, contrary to Benedictine custom.

They washed their hands (c. lxxvi.) before entering the Refectory, where the tables had already been set out with food, spoons, platters, and cups, by the cellarer, refectorar, and cooks, before the bell of the President rang; the lector began to read; and each monk having bowed to the high table produced his knife. Whether there were dinner and supper as in harvest time, or but one meal, there were only two messes (pulmenta) in the day, which were served by two hebdomadaries of the kitchen, 1½lb. of coarse bread. Honey was occasionally served. The servants dined at a second hall time, and then the cellarer took back the platters to the kitchen, whilst the monks read in cloister. If there was a fast the monks slept off their hunger between Sexts and two p.m. After Nones in summer, and after Vespers there was biberes, a draught of water in hall. Then followed collation in cloisters, reading out of the Lives of the Fathers; then Compline. A hemina of water was the allowance, whilst the field produced the pulse and beans, and the garden herbs; or the general dish was occasionally plain or boiled milk. At supper, fruits and raw herbs only were served. Novices had wine and icera, probably ale. (cxviii.) The modest meal over, the President rapped with his knife on the table, the monks cleaned their knives

on their bread and the cloth, the cook collected the knives, and the convent, two and two, juniors first, left the hall singing the Miserere and went to church, and in summer to the meridian or noonday sleep in the dormitory. Those who were bled or infirm had pittances of fish, eggs, milk and cheese. The times for bleeding were in February, April, June, and September, and the patients were free from labour during the three days; the operation must have been severe, for a bread cutter was appointed to serve them in hall, and the monks, two and two, in their night cowl, tunic and boots, lay down in their beds; having been sprinkled with holy water by the abbot as they passed the church door. After Lauds they put on their day clothes and took their knives.

All the offices were under the charge of inspectors who were appointed annually on the first Sunday in Lent. A light burned for readers in the chapter-house and cloisters, and before the aumbry. No one but the chanter and writers were ever permitted to enter the kitchen (c. lxxii.), and then only provided there was no fire in the calefactory, to liquefy ink, smooth the wax tablets, or dry parchment; and the sacristan to obtain salt for benediction, charcoal for the censers, and lights for the church. The infirmarer, abbots, cooks, and the cooks' assistants, in order to lift a caldron, were also admitted. Monks might go into the parlour, but not more than two at a time, to speak with the Prior on business. In the cloisters the readers kept silence, and the chanter heard those appointed for the duties rehearse what they were to sing or read. No one was to allow his cowl to fall over his face, in order that sleepers might be detected. Books were returned to the aumbry, or left in charge of the next sitter by readers. On Palm Sunday, Purification, and the Ascension there were processions, and three stations were appointed—one next the dormitory door, the second near the hall door, and the third at the church door, where the monks usually entered, and the chapter-house pulpit was placed there. First went the sub-deacon with the sprinkler and the deacon with the cross, followed by the lay-brothers, novices, and monks, the abbot and mass priest walking last. On Maundy Thursday the porter arranged in the north alley of the cloister as many poor folk as there were monks in the house; their feet were washed by the brethren, and they received each 1d. Then the abbot washed the feet of four monks, four novices, and four lay-brothers; and the rest washed each other's feet. On seven days in the year, but after the General Chapter in 1257 on twelve days, the monks shaved in cloister, the lay-brothers bringing water and towels. At the same date copes were allowed to abbots and dalmatics to assistants at the altar. (Ann. Waverl., p. 280.)

Days were appointed for shaking clothes and drying them in the sun. After Matin Mass all met in chapter, and on taking their seats each reverently bowed. The reader at his pulpit read chapters from the Rule, and the roll of officiants for the week (each bowing at his name), and the commemoration of the dead. The President then said "Loquamur de ordine nostro," and business was transacted, or if a delinquent was to be punished, he took off his cowl, pulled his arms through the hood of his tunic, and bared his body to the girdle and was scourged. On leaving, all bowed to the East, and retired to read in cloister or pray in church. On fifteen days there were sermons in chapter. The Abbot sat on the right side of the choir; sang Mass on the great festivals and for the dead, blessed the candles or Purification ashes on Ash Wednesday, the branches on Palm Sunday, the fire on Easter Eve, and the tonsures of novices. He held chapter and collation, appointed the Prior, sub-Prior, and Chanter, promoted and degraded, punished and absolved. He heard confessions, sprinkled the convent after Compline with holy water, and dined in the Guest House, where if he had no guests he entertained two monks.

The Prior sat on the north side of the choir, and on the right hand of the Abbot in chapter. He summoned by beats on the tablet to chapter and labour, and rang the bell for washing, and the nola in refectory, where he presided. He took his week's turn in the kitchen and to serve in hall.

The sub-Prior had charge of the monks in choir, cloister, and chapter, and presided in hall during the Prior's turn to serve.

The Master of the Novices was in charge of the novices.

The sacristan and his assistant had charge of the furniture of the church, rang the bell for service, collation, chapter, mixtum, and biberes; lighted the candles and lamps, opened the doors, made the hosts, and provided oil for extreme unction, and all necessaries for ceremonials and divine worship. Like the cellarer, infirmarer, and hospitaller, the sacristan had his own sleeping place. (Martine de Ant, mon. rit. I., c. xii. § 30.) It was in a corner of the church. (Ibid.)

The chanter sat on the south side of the choir and the sub-chanter on the north. He took care of the books and superintended the musical services, and tabled all who were to take part in divine workship on the weekly board. He instructed in reading and singing, and kept the aumbry of books, which he divided annually among the monks on loan on the first Sunday in Lent. He drew up the briefs announcing to monasteries in communion the death of a monk.

The infirmarer had charge of the sick and aged, and when a monk was dying laid him upon his bed on the ground, and struck the tablet at the cloister-door to summon the brethren.

The cellarer and his assistant had charge of the food; visited the hall at meal times, numbered the dishes on Saturdays; and saw that on Good Friday the church was cleaned, after vespers, and the cloister and chapter-house after Compline. He presented novices for admission.

The refectorer distributed the napkins, spoons, and messes in hall with the assistance of the cook.

The hospitaller had charge of the guests, the porter introduced the Bishop to the Abbot who led him by the hand successively into the choir, chapter-house, and hostry; when ordinary guests knocked he replied, "Deo gratias," and opened the gate. He said, "Benedicite," and inquired their pleasure; if they wished to enter, he made a genuflection and bade them sit down in his lodge, saying, "Wait awhile, till I inform the abbot and come back." When the guest departed the porter made also a genuflection.

Like a Cistercian porter I will now make my humble bow, wishing you a better journey than Horace Walpole in 1752, who says, "at ten we arrived at a wretched village called Rotherbridge. We had six miles further but determined to stop, as it would be a pity to break our necks before we had seen all we intended. But alas, there was only one bed to be had; all the rest were inhabited by smugglers, whom the people of the house called mountebanks, and with one of whom the lady of the den told Mr. Chute he might lie. We did not at all take to this society, but armed with links and lanthorns set out again upon this impracticable journey . . through these mountains where the young gentlemen are forced to drive their curricles with a pair of oxen." (Letters I., 260.)

SELE AND WILMINGTON.

In contrast with this monastery I may add the following inventory of the Carmelites' house of Sele, Sussex, preserved in the Public Record Office, and dated July 16, without any year:—"All the stuff ther ys a spete, a sory [sorry] bell, iij or iij old formeys, ij or ij ragged cheseabulls [chasubles] and tenakylls [tunicles], all priceyed at iijs. [iijd.]

"Ther ys a lyteyll bell in the parysche stepull the whyche the Freers useyd, but the parysche sathe that yt longyth to them but yt ys priceyd vjs. viijd.

"Ther ys iiij acres of a grounde with the byldeyngs orcherds and closeys, the wyche hathe belatyn [been let] for xs. by yere. There be stalls in the quere worthe xxs., thys ys all the holl substans of that howse."

The notice of a parish steeple may be illustrated from the arrangements of Wilmington Priory, a cell of the Benedictine Abbey of Grestein in Normandy. (See Addit. MS. 5671, fo. 51.) The south front, with lateral turrets, of the Gatehouse of the fifteenth century remains, with a large mass of buildings. The south-east front retains two angle buttresses. Adjoining it was the refectory, over a groined cellarage, 23ft. square, with a central pillar, and retaining arched doorways in the interior. Another building, running northwards, formed the dormitory, facing the nave of the church. The latter consists of an aisleless nave, a north porch for the parishioners, a north chapel like the arm of a transept, which has a south wing, not in the same plane, and a large Norman choir used by the friars, with later additions, and approached from the monastery by a southern doorway, in the south transeptal arm. The whole western portion, with the north arm of the transept and steeple, was allotted, as at Sele, to the parishioners, the rest of the building being reserved to the friars.

MICHELHAM.

There is a house of Austin Canons at Michelham, near Hailsham (see Addit. MS. 5671, fo. 86, 87), hitherto incorrectly described. The church is utterly gone, a few mounds only indicating its site in an orchard. The Great Western Gatehouse, late Perpendicular, of three stories, containing probably the Guest Chambers, stands fronting a bridge over a moat. At the north-east of it are remains of an ancient building. Detached more to the south-east is a block of buildings in the shape of an imperfect T. The stalk forms part of the western side of the cloister-garth. At the north end a wall, pierced with an arch, communicates with a portion of cellarage, of two bays and two alleys, 33ft. by 30ft., with tripartite vaulting, and a single central round pillar. On the exterior or north wall are traces of two arches, and a pillar in continuation of the cellarage. Above it is a large chamber, with a large double fireplace, probably part of the Prior's lodging, with a round-headed doorway high up on the wall towards the west. Next to the cloister is a vaulted narrow passage, 33ft. by 10ft., with doorways on the north, south, east, and west, vulgarly called "Isaac's Hole." On the south side of the cloister square is the Refectory, 61ft. by 36ft., with a small square window, a doorway, and a recessed lavatory, 15ft. long, with four Early English shafts and capitals with good foliage and a second doorway in the north wall. In the east wall are an aumbry and doorway, the latter immediately adjoining the south door of the vaulted passage, which must have communicated both with the cellarage and butteries. On the east side of the refectory are modernised rooms, possibly a portion of the Prior's Lodge. A door at the south-west side of the refectory probably communicated with the kitchen.

MACKENZIE E. C. WALCOTT, B.D., F.S.A.,
58, Belgrave-road, S.W.

THE OLD CHURCH, LAMBETH.—The late winds have considerably damaged the roof of this building, and it appears the churchwardens have no funds to meet such repairs, the congregation attending service in the church being, unlike those attending the district churches, where collections are liberally responded to, for the most part composed of the poorer inhabitants of the neighbourhood.

The Surveyor.

IMPROVED SURVEYOR'S MEASURE AND TACKLE CASE.

IT is of importance to surveyors in measuring land to have as little weight as possible to carry about with them. The apparatus now illustrated, which is the invention of Colonel W. Payne, of the U.S. Army, may be therefore well worth their notice.

The measure consists of a narrow steel tape, of a low spring temper, coated on one side with zinc to prevent oxidation of the steel. It is made of such length and with each graduations as may be desired.

FIG. 1

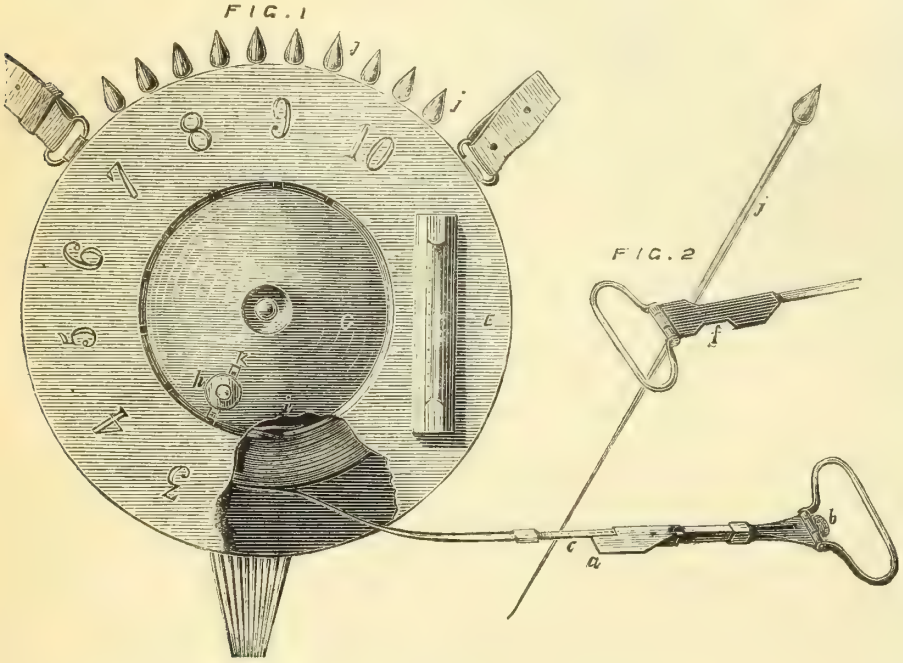


FIG. 2

When in use a handle is attached to each end of the tape. The manner of attaching is plainly shown in Fig. 1. Connected with each handle is a shoulder, to represent each end of the measure, and with which the contacts are made in measuring. Both shoulders face in the same direction.

One of these shoulders, *a*, is connected with a graduated scale *c*, and may be moved along the tape by means of a tangent screw *b*, so as to compensate for the expansion or contraction of the measure caused by changes of temperature.

The case is made of sheet brass, on the front of which is a thermometer E. The usual complement of marking-pins *j j* are received in apertures provided for them, while the tally record is kept by turning the nob *h* to the proper figure and fastening it there by slipping the bolt *k*.

When not in use the tape is coiled within the case around the rim or flange of the revolving plate G. This is effected by passing the end of the tape through an opening in the edge of the case, continuing it until it enters an opening in the flange of the interior plate, near the knob *h*, represented in the cut at *i*, where it will be held by a small spring against the inside of the flange, when the plate may be revolved by the knob and the tape wound in upon the flange, as seen in Fig. 1.

The handles, when detached, are received in pockets provided in the edge of the case.

The case is provided with a strap to suspend it at the side of the chain carrier.

Some of the advantages which this measure possesses over the chains in common use, are as follows :—

The measure being in one piece, the liability to elongate by wearing at numerous joints is wholly obviated, while the slight wear of one one-hundredth of an inch at each of the six hundred places liable to wear in the common chain would cause an error of forty feet in measuring one mile.

The metal of which this measure is constructed is, throughout and at all points, in the most favourable position to sustain any strain to which it may be subjected ; hence it is made lighter, and at the same time is stronger, than measures of any other form of construction.

One chain (four rods) of this tape weighs but ten to twelve ounces, while the chain in common use weighs nearly as many pounds.

The tensile strength of tape of this size is more than four hundred pounds.

Its extreme lightness and straight spring temper enable the sag or curve, which is a great source of error, to be almost wholly removed by comparatively a small strain, whereas with a strain of 20lb. on a common chain of number six wire, there will be still an error which would amount to 58ft. in one mile.

The arrangement by which errors arising from changes of temperature are compensated for is easily adjusted, effective, and simple.

The manner of making the contacts by means of shoulders facing in the same direction overcomes another of the many causes of error in common surveys.

The case, suspended at the side of the chainman, places in the most convenient position the complement of marking pins, not one of which could be missing without attracting attention, while the peculiar manner of carrying them admits of an improvement in their form. Their heads are made plummet-shaped, so that they may be inverted and dropped with a considerable degree of accuracy when occasion requires.

These, together with the convenient method of keeping the tally record by turning the knob, using it as an index, to the proper figure on the front of the case, and there securing it, ensures correctness in the record, combined with accuracy in the measurements, and facility of use, probably never before attained by any other instrument.

INSTITUTION OF SURVEYORS.

AT an ordinary general meeting held on Monday, January 24th, the following names were read and passed to be balloted for on February 21st, viz.:—As Members.—John Carter Clayden, Barnet, Herts ; Edmund Rushworth, 22, Savile-row. As Associate.—Charles William Thompson, 17, Parliament-street, S.W.

The following donations to the library were announced :—Seven volumes of "The Journal of the Royal Agricultural Society," by D. Watney ; W. Blyth's "Survey of Husbandry," by C. J. Shoppee ; J. Duncumbe's "Survey of Herefordshire ;" W. Mavor's "Survey of Berkshire ;" J. Billingsley's "Survey of Somersetshire ;" J. Billingsley's "Survey of Oxfordshire ;" A. Swann's "British Architect ;" A. Swann's "Collection of Designs in Architecture, 2 vols. ; "Museum Rusticum," in 6 vols. ; "Vitruvius Britannicus," in 3 vols., by Richard Hall ; "Report of the Committee of the British Association on the Treatment and Utilisation of Sewage," by R. B. Grantham ; Various Pamphlets on Sewage and the Ventilation of Sewers ; "Report of Select Committee of the House of Lords on the Regulation of the Powers of Land Companies," by G. Taylor ; Report of the Enquiry as to the alleged Pollution of the River Thames at Barking," by Local Government Act Office.

The following candidates were balloted for, and declared duly elected, viz. :—As Members.—John Edward Poundley, Blackhill, Kerry, Montgomeryshire ; George Rawlence, Salisbury. As Associate.—Andrew Johnstone, 25, Gresham-street, E.C.

At the usual meeting on Monday evening last, Mr. John Clutton, President, in the chair, a discussion took place on Mr. Edward Smyth's paper "On the Enfranchisement of Copyholds of Inheritance," read on the 10th January. The discussion was opened by

Mr. TAYLOR, of the Tithe Commission Office, who, after calling attention to the provisions of the Copyhold Act of 1841, and the amendments thereto of 1844, remarked that the adoption of a definite principle in regard to the commutation of tithes was obviously attended with great advantage ; but it might be doubted whether a similar course would be pursued in the enfranchisement of copyholds, the great obstacle being the varying value of copyholds in or near cities and towns, and in rural districts. It was, he said, to be expected that on the passing of the Voluntary Act, which gave lords having a limited estate, the power to enfranchise, from the great outcry there had been against copyhold tenure, subject to arbitrary fines, that there would have been a large amount of business brought to the office of the Copyhold Commissioners, but the fact was that during the period from 1841 to 1852 inclusive, the total number of cases was only 445 in the eleven years. The reason he ventured to assign for this was, that not only copyhold tenants, but the Copyhold Commissioners were in ignorance as to what was an adequate compensation for the incidents relating to copyhold tenure. The Commissioners, however, applied their attention to obtaining the best information they could as to the proper terms for enfranchisement ; but of the 9302 cases completed to December 31 last, there was only one effected by commutation, the remainder consisting entirely of enfranchisments. The incidents of enfranchisement were comprised under the several heads of timber, minerals, quit-rents, copyholds subject to fines certain, copyholds for live heriots, and copyholds subject to fines arbitrary. The compensation to the lord under the head of timber was a simple one, and did not create any difficulty with valuers. The lord had only to prove his right to the timber, and the valuer could then form his judgment. In some manors the lord claimed the whole of the timber, subject to an allowance for repairs. With regard to minerals, it was impossible to give any data for including this right in an award of enfranchisement, as it must depend entirely upon the subsoil, and whether any minerals existed. With respect to quit-rents, the Commissioners now advised twenty-eight years' purchase for this particular incident, and valuers had no difficulty in settling the money-right for this incident. In regard to copyholds subject to fines certain, in the first paper issued by the Commissioners prior to the passing of the compulsory Act of 1852, the times for the enfranchisement of copyhold of fixed fines was stated to be one year's value ; but parties interested in these manors complained that these terms were excessive, and the Commissioners now endorsed as proper terms for the extinguishment of such fines from 1½ to 2½ fines, according to the age of the tenant. As to copyholds for lives, the Commissioners did not offer any advice as to the terms of enfranchisement of this class of copyholders, as sufficient tables were published to guide valuers. In his judgment it would be well to ignore the terms of six years' value for copyholds for three lives and four years' annual value for copyholds for six lives. For heriots it was now recommended that the sum to be paid for a heriot should be calculated on the same principle as the compensation for an arbitrary fine—or one-half of the value of such heriot on alienation, and when payable on death one quarter the value of such heriot. In reference to the last incident, viz., copyholds subject to fines arbitrary, the table prepared by the Government actuary had been in existence since 1858, and was based upon the principle that it would be equivalent to a fine of two years' annual value about every fifteen years, which appeared to be the average interval of change of tenure in ordinary copyholds subject to fines arbitrary ; and this table appeared to give general satisfaction, and he believed it had

been the means of producing a harmonising influence between lords and tenants, and between lords' valuers and tenants' valuers, in adjusting the proper terms of enfranchisement. In conclusion, Mr. Taylor quoted the opinion of the late Rev. A. Jones, a Tithe and Copyhold Commissioner, to the effect that after a sufficient time had been allowed for lords and tenants to enfranchise, a public act must be passed for the extinction of copyhold tenure in this country.

Mr. W. BROWN, of Tring, spoke in favour of abolition of copyhold tenures, and gave instances of his long experience on various manors of the working of the present system. Owing to the difficulties and great expense attending enfranchisement in several cases to which he referred, only a small percentage of enfranchisements had taken place; in other instances the facilities offered were great and free from all redtapeism and in such cases a large number of enfranchisements had been affected on conditions mutually beneficial to lord and tenant. He advocated rent charges where parties were under disabilities. With respect to mines and minerals they cost more in reservation in conveyance and conditions of sale than they were worth. In proof of the unsatisfactory working of the present system he mentioned cases in which, on a change of ownership, property of the annual value of £5 and quit rent 1s. 2d. had been subject to a total charge for lord's compensation, steward's fees, valuer's and solicitor's charges, of upwards of £38. In another case, where the property was of the annual value of £11, the charges amounted to £56, and others in proportion.

Mr. C. J. SMITH reviewed several points brought forward in the paper, and expressed his opinion that the discrepancies between the tables of the Copyhold Commissioners and those of Mr. Rouse arose from the different estimation of the frequency of alienation, and he thought both the Commissioners and the author of the paper had overestimated the difference between the ages of twenty and seventy years. The speaker supported that position by some able arguments.

Mr. R. C. DRIVER spoke upon the subject of license of demise, and was followed by Mr. WATNEY, on the subject of rights of mines and minerals, timber, gravel, &c.

After a few general observations by Mr. TUCKETT,

Mr. E. SMYTH replied upon the discussion, and in an able manner vindicated the principles he had laid down as those by which transactions of this nature should be governed, after which

The PRESIDENT summed up the discussion with some practical observations, and the meeting adjourned.

ARCHÆOLOGICAL

MOABITISH ANTIQUITIES.—A letter from Jerusalem, published in the *Journal Officiel*, gives the following account of a remarkable archæological discovery made by M. Clermont Ganneau, dragoman to the Consulate of France in that city. The object is "a great block of basalt found to the eastward of the Dead Sea, in the territory of the ancient Moabites. Upon this block is engraved an inscription some 30 lines in length, in Phœnician characters, commencing with these words, 'I, Mesa, Son of Chamos.' Mesa was a Moabitish King, who is mentioned in the Bible, and contemporary with the Prophet Elisha, with Jehoshaphat, King of Judea, and Ahab, Ochozias, and Joram, Kings of Israel. The 3rd and 4th chapters of the Second Book of Kings give a detailed recital of the campaign undertaken in concert by Joram and Jehoshaphat against Mesa, King of Moab. The inscription upon the stone also refers to the struggle of Mesa against the King of Israel, and enumerates the towns built and the temples erected by Mesa, and dedicated by him to the national deity of the Moabites—Chamos. The age of this monument is determined by the agreement of its statements with Jewish history; it dates nine centuries before the Christian era, and is nearly a century later than the reign of Solomon. It is nearly two centuries earlier than the famous sarcophagus of Echmonnazar, King of Sidon. The Phœnician characters of the inscription present some archaic features not to be found in the same degree in any of the Phœnician monuments hitherto known. The inscription, however, is decipherable with almost absolute certainty, as each word is separated by a point, and all the sentences are divided by vertical lines. The language is, with some slight orthographic variations, pure Hebrew.

Furniture & Decoration.

ON ORNAMENTAL IRONWORK.

THE first of a series of six lectures on ornamental ironwork, under the auspices of the Department of Science and Art, was delivered on Monday evening last in the Lecture Theatre of the South Kensington Museum by Mr. J. M. Capes, M.A., of Balliol College, Oxford. The lecturer commenced by some allusions of a general nature as to the utility of iron for constructive and domestic purposes, remarking that the present was emphatically *the* iron age of the world. Turning to the employment of iron in works of beauty, the lecturer said that hardly ever has the art of ornamental ironwork been so miserably low and degraded as at the present time, and it is usually sought to cast the blame of this upon the artisan. There was no doubt a loud cry for the improvement of the art education of English workmen. Scarcely a week passes without it being declared in public meeting that we are being beaten by foreigners in the markets of the world, simply because our workmen are not instructed in design and beauty of execution. "Frenchmen, Germans, and Italians," it is said, "are better designers than our own artisans. They know how to distinguish between the ugly and the beautiful better than English workmen. When you set a foreigner to any work of ornamentation he enters into his task with real pleasure; he feels like a painter of pictures or a good performer on the pianoforte, and not merely as if he were a journeyman baker turning out so many loaves in a given time. Teach our workmen well, and we shall not long have to fear foreign rivals." This is far from being a true statement of the whole case. It is certain that our artisans have less taste than the artisans of many foreign nations, and that, in some kinds of work, it would be impossible to find an English workman to do what a foreign workman can do. But when the blame of this state of things is laid chiefly on the working classes the saddle is not put upon the right horse. Our workmen are in some things inferior to what they were some hundreds of years ago, because there has been no demand for the highest class of labour. Five hundred years ago the land swarmed with skilled workmen; but for many generations the taste of the rich has been vile and debased, and any better taste and skill in the working classes would have been totally thrown away upon those who could not appreciate it. There has been no demand for exquisite workmanship in the industrial arts in recent times, and more especially is this the case with regard to ironwork. The whole country is overspread with ornamental ironwork, which, as a rule, is simply detestable. Our iron furniture and the ironwork of our houses, churches, and public buildings are, as a whole, neither more nor less than abominable in design and miserable in execution. What has been the cause of this? Two things:—1, the miserably bad taste of the richer classes for the last two or three hundred years; and 2, the almost universal adoption of a process of manufacture which is utterly fatal to good design and good workmanship in iron—the process of casting iron, instead of forging and hammering it. The one object has been cheapness and nothing else. Without saying a word against the great utility of cast metal in a vast number of works, the lecturer most strongly condemned the indiscriminate use of the casting process in all kinds of work solely for the sake of turning out cheaper goods than any in the market. The consequence of this banishment of the forge in favour of the foundry has been the general debasement of the national taste in metal work. The popular taste in gold, silver, and bronze work is nearly as bad as in iron and brass. English purchasers of metalwork have had their minds demoralised through this casting process. As things now stand, the most delightful and finished workmanship is, to a great degree, thrown away. Fashionable designs in gold and silver are, for the most part, very little better than those in bronze and iron which still "go down" with the multitude. If it is asked "How is it that the practice of superseding wrought with cast iron has created so much mischief," the explanation is easy to give. The substitution of cast-iron for wrought has had three specially mischievous effects. In the first place, it has introduced fashions of using ironwork which are inconsistent with the essential nature of all metals, and thus has made ironwork simply a sham. In the second place, it banishes all those peculiar beauties in which metals stand far above all other materials whatsoever. Thirdly, it has made everybody careless as to excellence of finish and general merit of workmanship; in fact, it has degraded the workman in iron into a mere machine—instead of making him an artist, it has dragged him down to the level of a stoker of a steam engine. The first point brings us face to face with the one grand fundamental rule to be observed in all kinds of ornamental works, of whatever size or material. It is this: that whether we build a church or design a door or window or an iron gate or railing, the first thing to aim at is a strongly constructed plan or frame, suitable to the work and adapted to the material it is wished to employ. Having devised a thoroughly serviceable skeleton, we should finish by making it ornamental, instead of leaving it bare or ugly. The lecturer, in illustration of his argument, here referred to the relations which subsist between the skeleton and the flesh, muscles, &c., of the human body, remarking that the Great Creator puts His finishing touch to the human form by making its exterior beautiful. In the whole of nature there is nothing so beautiful as the human figure, with its almost divine countenance reflecting the mind within. Every portion of the human frame wears on it the impress of beauty. In a word, the construction of the body is designed for practical use, and then that construction itself is made lovely to our eyes; and this is the one golden rule to be observed in all our feeble efforts to produce beautiful things in art. The same rule is carried out in *all* Nature, and it is the true principle on which art workmanship of every kind should be designed and completed. The lecturer next proceeded to refer to various specimens of ornamental ironwork which were on the table, pointing out their artistic beauties and principles of design, and, where there were any, their defects. He observed that the best examples of mediæval metal work were those in which the forms were architecturally disposed, or which were derived from architecture, and went on to say that those who had not already examined the collection of ornamental ironwork in the Museum would be astonished at the cleverness and invention displayed by the workmen of old. One or two aspects of the art of working in metals were next mentioned. In the first place, Mr. Capes said that there is scarcely any other branch of art workmanship in which so splendid a field lies open to the English mechanic as work in iron, and, in a lesser degree, in bronze and in brass. The raw material is of little value compared with the labour and skill bestowed upon it. Raw material costing only a few shillings could be greatly enhanced in value by the bestowal on it of artistic skill. This kind of work is eminently suited to the artisan, whose labour is his capital. What is wanted is some sort of scheme for helping that labour, so as to bring him in the surest return with the least possible risk and money outlay. With a forge, a few hammers, chisels, files, &c., he can convert plain ugly bars of iron into useful ornamental work which will fetch a high price in the market. But it is a grievous mistake to suppose that the artisan will gain nothing more than a better market for his work by cultivating the art of working in metals. Without undervaluing the vast importance of enabling the workman to bring a better and more profitable article into the market—for men must live by their work, whether ugly or beautiful—Mr. Capes said in conclusion that the very act of emulation in producing works of beauty would bring the brains of the workman into play, and employ his talents in a way that could not possibly be the case if his life resembled that of a mere machine. The actual daily life of a man who labours patiently to produce beautiful and rationally useful things is a far better life than that of the man who only toils on like a horse in a mill. Every man whose mind is at all educated enjoys the time he spends in inventing, executing, or finishing any object which satisfies his tastes. Instead of being a dreary toil, such a workman literally finds a pleasure in his labour. Rely upon it, said Mr. Capes, the workmen who wrought upon the specimens of ancient metalwork in the Museum felt differently from the workers in our iron foundries at the present day, where fire, machinery, and casting do everything. The man who has a cultivated sense of what is beautiful, and whose own daily occupations call forth the full exercise of his talents, actually possesses a source of enjoyment greater than that he would have if he had

only to work like a mere animal machine. He is not only a healthier, but it is his own fault if he is not a better man.

The lecturer was listened to by a crowded and attentive audience, evidently composed, for the greater part, of working men. The next lecture will be given on Monday evening next, at eight o'clock.

ON ORNAMENTAL ART.*

By HENRY O'NEIL, A.R.A.

IT has been frequently observed by writers on the Fine Arts—poetry, painting, sculpture, architecture, and music—that the essence of art begins where utility ends; and, more especially, that the abstract quality of ornament is useless. This doctrine, however, is not only narrow, but utterly false. Pleasure is a mental want which the senses are fashioned to satisfy; and aught that produces that pleasure must be useful in the highest sense. Nature, in her useful creativeness, does not despise beauty of form and colour in producing unsparingly the things requisite for bodily wants; and art, in however low a degree, is but a reflex of nature; and its mission is to arouse, in her absence, kindred feelings to those excited in her presence. In a word, Nature is the mistress of Art; and it would ill become the latter to despise the means whereby the former works, even in ministering merely to our bodily wants. To cite a most homely instance—a room without ornament of any kind may be equally useful as one with ornament; but the latter, even in the absence of taste, will give more pleasure to its owner. So, instead of denouncing the inutility of ornamental art, I would plead for its usefulness in the highest sense. For of all the arts, however humble in degree, that of ornament has by far the most extensive influence in ministering to the pleasure of the senses. To every production of human ingenuity—from the stately edifice down to the meanest object in domestic use—its presence adds a charm, which, though to the mere utilitarian seemingly of no practical value, creates taste and refinement; and, moreover, in contributing practically to a nation's prosperity, promotes the cause of civilisation.

The faculty of the mind which especially influences the character of ornamental art is taste—the possession of which is, with all deference to those who term it a natural instinct, wholly an acquirement. Now there is a prevailing error—and of old standing—that because some men prefer Greuze to Titian, Verdi to Beethoven, or Tupper to Tennyson, taste, therefore, is not to be disputed; and, moreover, that it has no fixed standard. But our prejudices, our likes and dislikes, must not be mistaken for Taste; and its fixed standard is the thorough appreciation of what is really true and beautiful. Moreover, as taste is wholly an acquirement, its presence betokens the mental health of its possessor; and proves, thoroughly, that the perceptive faculties have been accustomed to the presence of beauty, and have not been degraded by a continual association with deformity. But custom and ignorance vitiate taste.

Art has often been termed creative, but it can only be so in a very limited sense, inasmuch as it is utterly impossible to conceive or model any colour or form which is not to be found, partially or wholly, in Nature—the knowledge of whose works is the food of art. But though art is thus based especially on the reproduction of the form and colour which nature displays, it should—especially ornamental art—be rather suggestive than imitative; and, instead of copying the actual form and colour of Nature's works, the artist should be chiefly guided by the great motive on which Nature acts. That motive is fitness to the work to be done—so that, in all her works, there is neither redundancy nor poverty. The trunk of a tree, or the stem of a flower, is proportionate to the weight to be borne; and the minutest branch has the adequate power to support the leaves it puts forth. And this fitness is so perfect throughout as to make us almost feel that all living things—from a human being down to a blade of grass—are the growth of necessity, alone emanating from a Supreme Intelligence, which ministers, with boundless wealth, to the highest and meanest wants of the life it creates.

It is this fitness to the work to be done which shapes the productions of Nature, and gives birth to its boundless diversity of character in form and colour. From thence spring strength and delicacy, variety and simplicity, grace and beauty, and the quality of the work to be done affects the character of every object, and imparts to each such of the attributes I have named as are requisite to attain the end in view. In the human frame all these qualities are embodied in their utmost perfection, because the work of humanity is more universal than that of any other production in animal or vegetable life.

I have said that the characteristic features of Nature's works are strength, delicacy, variety, simplicity, grace, and beauty; and the ornamental or decorative artist, in his endeavours to impart any of those qualities to his work, must especially beware of the slightest exaggeration. The strength must be free from redundancy, and the delicacy from weakness; the variety must be void of eccentricity, and the simplicity void of monotony; the grace must be free from affectation, and the beauty from inanity. And the artist, in any path of art—but more especially in that of ornament—who can give to his work, in a proportionate degree, the qualities I have named, must be esteemed as possessing that perfection of taste which, in spite of fashion, will have its beneficial influence in the far future, if not in the near present.

Other qualities than those I have mentioned are necessary in the treatment of colour; but at present let us confine our attention simply to form. And, first, of strength and delicacy—in which Nature's works are so perfect, so well adapted to the fulfilment of the work to be done. Every branch of a tree and every stem of a flower, as I have already said, are constructed so as to bear the weight of the superincumbent matter, unless local causes affect their direction. Look, for instance, at the largest tree, and you will find that the branches springing from the trunk—and every smaller branch springing from them, up to the final twig—are gradually smaller in dimensions; and, without pretending to complete accuracy, I believe that the sum of the parts is on an equality with the bulk of the parent trunk. In metal work, I know it is perfectly possible to add a superstratum out of all proportion to the support. But the eye—the sense only engaged—has simply conception, in that matter, of bulk; and the mind revolts at seeing the larger form grow out of the lesser. In designing a candelabrum, for instance, how agreeable is the gradual diminution of bulk, not only in the branches, but even in the spiral foundation. If you compare those of Pompeian manufacture—which, generally, are graceful in the extreme—I think you will find more beauty and fitness too in those spiral stems which, however imperceptibly, decrease in bulk from the root—take the obelisk and column—than in those which are of the same thickness throughout. The latter impart a sense of fragility and insecurity ill adapted to the end in view, even on the mere score of utility. Now this redundancy is the point on which we chiefly err, and the error is not one only of bulk, but also of form; that is to say, the latter is often so obtrusive in detail that the eye fails to grasp the whole design. For though on investigating the parts of a design we are charmed by the presence of the most elaborate workmanship, yet if those parts, by being too obtrusive, weaken the impression of the whole, the work must be pronounced faulty in that most important quality in ornamental art—namely, proportion.

I have said, however, that although the strength should be free from redundancy, the delicacy should be equally free from weakness. Unfortunately, a middle course has little in it to excite the exuberant spirits of youth; so, whether the direction leans towards redundancy or weakness, it too often flies to extremes, repulsive to a more refined and experienced taste. I could point out modern examples in architecture by the hundred which err equally in opposite directions; and, with respect to the error of making large foundations for light superstructures, the erection of single columns to support statues which can never be seen is a sign of that bad taste of which ancient Rome, in its most prosperous times, showed such unmistakable evidence. So, returning to the candelabrum, I would warn the artist not to make the solidity of the foundation out of all proportion to the superstructure.

Again. I have observed that the variety should be void of eccentricity, and the simplicity free from monotony. Now the error which most prevails in all the intellectual arts, affecting equally the character of our amusements, is eccentricity; and the mind, ever seeking for something new, however untrue, is now, and always, I fear, will be, too ready to accept that quality as an evidence of genius. But the history of human error should teach us to beware of mere novelty; and the distrust of that superficial quality will ever increase in proportion as reason and experience influence the judgment. And this, possibly, is why people who have arrived at a certain age are often accused of being cynics for not immediately appreciating those things which excite the enthusiastic admiration of the young; whereas, this critical and sceptical spirit is more often the result of greater experience. Moreover, as the probability of the duration of life becomes more uncertain, we lose the desire of running after novelty in the hope of finding fresh delight—rather keeping to more established sources of pleasure. But it would be folly on this account to reject novelty, provided that it is a fresh application of principles which have hitherto influenced art, and not a mere deviation from established form. Nor in any art is eccentricity more certain to lead to errors of taste than in that of ornament—the materials being so abundant for eccentricity to turn to a perverse use. In the earliest stages of art—and, in a more confined degree, carried down to the very present day—it was the custom to unite features which do not naturally belong to the objects represented. So, to express the universality of human action, the heads of beasts and the wings of birds were freely added to the figure of man; but the conceit was poor, for the human face and figure are fully and solely capable of giving expression to the various attributes of man. Moreover, as regards the originality of the proceeding, it is of as poor invention as would be that of the artist who to the stem and leaves of a rose tree added the blossoms of the lily. With respect to the introduction of such animal forms in ornamental art, the practice has been, and is, so common and so time-honoured that I feel the greatest diffidence in uttering any objections; though I cannot but think that instead of putting a lion's paw or a bird's claw to represent the foot of a table, it would show more ingenuity and more taste in the artist if, acting under the principles that actuate nature, he could invent forms which should not be out of all keeping with the objects produced. At all events, I have no doubt on this point—that the combination of an angel's head and wings with a scrolled form which ends in a beast's claw is a ridiculous proceeding, eccentric, but not original, and utterly repugnant to sound taste.

As regards simplicity, and the necessity of avoiding monotony in the attempt to produce it, I have little to say; for though monotony is a prevailing error, yet simplicity in all our works and deeds is not a prevailing virtue. Even in dress and cookery—and as long as the eye and the palate are so constituted as they have ever been, what pleases those senses must have its usefulness—we are wanting in simplicity, and exuberant in monotony.

If we turn to what is generally accepted as a higher art, namely architecture, we shall find there is a want of simplicity in its highest efforts, and an equal monotony in its lowest. In the former our architects seem impelled by the same desire as that which evidently excites two street bands in close proximity, and which strive for public attention by their loudness of appeal. The florid flares in juxtaposition to the simple style, and the whole produces confusion. If we compare those streets at home which are most renowned for their public buildings—such as Pall Mall—with those of the same order in Paris and other continental cities, we cannot fail to be impressed by the latter, on account of the comparative uniformity of the architecture, though abounding in variety of ornament. Again, if we look at our streets of shops, or our miles of stuccoed villas, all, or most, of one pattern, we are so sick of the monotony of the latter, and of the want of some general motive in the former, that one feels half inclined to regret that every Englishman's house should be regarded as his own castle, and that he may deal with it, outwardly, according to individual prejudice, without any regard to general appearance. In what is termed purely ornamental art the same want of taste is seen in the form and colour of the furniture in our most lavishly decorated rooms. There we find jumbled together the utmost incongruity in form, and the greatest variety in

* From a paper read before the Associated Arts Institute on Saturday evening, February 5, 1870.

colour; and, much as I uphold the charm of variety, I cannot but think the eye would be better pleased if chairs, carpets, curtains, table-covers, and walls were not so obtrusive and clashing in their effects. I have seen rooms wherein the objects I have named have various shades of one colour, without producing any monotonous effect; and so in form, though objecting to a thoroughly plain carpet, it is surely possible to gratify the eye by beauty of form and colour without going to an extreme, and offending taste by the introduction of fruit and flowers in profusion, which are not naturally produced on carpets and tables, and not made to tread on. Nay, even could you, by some process, produce a carpet which in form and colour should be literally like a blooming meadow, your skill would be thrown away, except to excite a smile of pity, or even contempt, at misdirected ingenuity.

We come now to the consideration of grace and beauty, which may be termed the elimination of the qualities I have named in Nature—separately or combined. For there are grace and beauty of strength, as well as of delicacy; of variety, as well as of simplicity; and though the fitness of Nature's works, in the ordinary meaning of utility, does not depend upon the presence of grace and beauty, yet, in the highest sense, they proclaim the usefulness of the work by the amount of mental pleasure they contribute. I have said that the grace must be free from affectation, and the beauty from inanity; and in support of my argument I can only refer you to those works of art which have been specially designed to develop those pleasure-giving qualities. Take a child by Reynolds, and one by Greuze; a Madonna by Raphael, and one by Carlo Dolce; a senator by Titian, and one by Kneller, or even Lely; these examples, without putting others before you, derived from poetry, sculpture, architecture, or music, will fully explain my meaning. And if I do not allude to Nature's works in support of my argument, it is because there are other means whereby Nature—for a good purpose we may be sure—appeals to our senses. For however pure may be our pleasure in contemplating beauty, yet there are other emotions which are not excited in its presence; but which, being distinctive of *human* nature, must have a beneficial influence, and are therefore worthy to be vivified by art. And this is the reason why I have ever strongly opposed that narrow doctrine which now especially prevails: that the aim of painting, sculpture, poetry, and music should be merely the excitement of the one pleasure aroused by the mere development of beauty. But ornamental art is single in its aim, and it cannot add its tribute to our ceaseless craving for pleasure by awakening terror or any other human passion, but must do so alone by the means of grace and beauty; and boundless indeed is the field wherein it works.

(To be continued.)

PARLIAMENTARY NOTES.

EPPING FOREST.—On Tuesday, in the House of Commons, Mr. Fawcett said that on Monday next he would move an address to the Crown praying for the enforcement of the Crown rights in Epping Forest, in order that it might be preserved as an open space for the public.

NATIONAL GALLERY.—Mr. Candlish, on behalf of the hon. member for Sunderland, gave notice of a resolution to the effect that the National Gallery and British Museum should be opened from seven to ten o'clock on at least three evenings in the week, in order to accommodate the working classes.

PUBLIC PLACES.—Mr. Cowper gave notice that on Tuesday next he would bring in a bill to provide for the preservation of waste places and commons near towns as places of recreation.

IRON V. WOODEN RAILWAY BRIDGES IN AMERICA.—From the eighth annual report of the Erie Railway Company, we learn that as the bridges on the line, being of wood, require frequent renewals, and as the increasing scarcity of timber along the line enhances their cost from year to year, it has been decided to adopt iron bridges for all future renewals, where the proper foundation for permanent piers and abutments can be obtained. During the past season, in addition to several small bridges, an iron bridge, 650ft. long, in four spans, has been built over the Susquehanna river.

Building Intelligence.

WESTWARD HO, NORTH DEVON.—The church which has been in course of erection for the last eighteen months in this fashionable little watering place is now ready for opening. It is built in the Early Pointed style, and consists of a nave, north and south aisles, and chancel. Situated but one hundred yards from the sea beach, and therefore exposed to much rough weather during some portions of the year, strength and solidity have been aimed at. The exterior dressings are of granite from Lundy Isle, except only the hood moulds of the east and west windows and those of the doorways, which are of Marwood stone, and the carved angels, &c., of Forest of Dean. There is a bell turret for two bells. The stone used internally is Corsham Down. The capitals on the piers in the nave are moulded, and those in the chancel and chancel arch carved with simple and effective conventional foliage. The roof, which is of deal, and varnished, is supported by carved corbels. The walls are washed with a warm colour which contrasts happily with the Bathstone work. There is a prayer desk and lectern of oak, and chairs fill the nave, which when supplied with benches will seat 400. It is hoped in the course of a few seasons to raise funds for a good pulpit and reredos, together with oak benches. Mr. J. Tremear, of Bideford, has been the contractor for the whole of the work, with the exception of the carving, which is from the chisel of Mr. Harry Hems. Mr. W. C. Oliver, of Barnstaple, is the architect.

NEWINGTON.—At a recent meeting of the Vestry of S. Mary, Newington, Mr. Alder gave notice of the following motion: "That the paving and lighting committee be requested to view and report to the vestry upon the desirability of widening the road and pathway in Newington-butts, and of removing the old parish church to a more suitable site.

COLOGNE CATHEDRAL.—The progress made in the construction of Cologne Cathedral during the year 1869 was very satisfactory. The northern tower has reached a height of 180 feet above the ground. The state of the southern part was so bad that a great deal of the masonry had to be removed; 20 feet, however, have been rebuilt. The scaffolding for 1870 is almost ready, and the stone required has been purchased. The towers will now rise isolated above the building. They are to be built to a height of 30 feet a year, and in 1871 the third entablature will be reached, where the octagonal lanterns begin. The restoration of the masonry is continually progressing, and, according to the assurances of the architect, the cathedral will be completed in 1875 as far as the cruciform ornaments, should the subscriptions amount to 250,000 florins a year, as they have lately done. The interior of the cathedral has been ornamented with stained glass windows and statues, though in this respect much remains to be done.

BALLARAT.—A new (Roman) Catholic church is in course of erection at Ballarat (Australia). Mr. J. B. Denny is the architect. The style is 13th century Decorated Gothic. The width of the nave and aisles, clear of the walls, is 61ft.; length of nave, 105ft. by 31ft. 6in.; length of transepts, 100ft. by 25ft.; chancel, 50ft. by 28ft.; side chapels, 32ft. by 16ft.; sacristies, 20ft. by 16ft. The walls are of bluestone, with Kangaroo Point freestone dressings. The nave, arches, and clerestory walls are supported on blue-stone octagonal pillars, with moulded bases and caps, the arches encircled by a hood moulding; bluestone wall shafts, springing from carved corbels, support the principals of the roof; a bluestone string course, encircling the wall shafts, divides the triforium and clerestory. The roof is stained and varnished; the principals are of Oregon timber, and the spandrels filled with geometrical tracery, which gives the roof a light and elegant appearance. £1000 is to be expended in stained-glass for the windows. The church, exclusive of the presbytery, when completed, will have cost £25,000. The presbytery is in the Tudor style of architecture.

TAUNTON.—Last week a vestry meeting was held at S. James's Church, Taunton, to take steps for pulling down and rebuilding the tower of the parish church. The tower, which is a fine specimen of the Perpendicular style, has long been in a dilapidated state, and the parishioners have been divided in opinion as to whether it should be entirely rebuilt or simply restored. The buttresses and pinnacles, which were pronounced to be dangerous, were removed some time since, and the erection of new buttresses was commenced, but abandoned. It was resolved to pull down the tower and build a *facsimile*, and an influential committee was appointed to take the necessary steps for carrying out the work. The cost is estimated at between £3000 and £4000.

BUILDINGS.

HAMPSTEAD. — The new fever hospital at Hampstead has been erected within the short space of one month. The building runs in a slope almost due east and west; it is built of galvanised iron, furnished by Morton and Co., of Liverpool. The walls are lined internally with a layer of thick waterproof felting, and covered with planking. The hospital is built on concrete, and is well drained. The entire length of the building is traversed by a central corridor, from which run off the entrances to the different blocks. The wards are in the western, and the administrative department in the eastern end of the building. The space allowed to each patient is about 1200ft. To each ward are attached a small kitchen and a bath-room, with lavatories. The ventilation varies: Pott's system has been introduced into one of the male wards. The nurses' block affords accommodation for about a dozen nurses, with a cubic space of 900ft. to each bed. A deadhouse has been built a little way off. The cost of the hospital, which affords accommodation for about 100 patients, is £8000. Messrs. Giles and Biven are the architects; and Messrs. Henshaw were the contractors.

RAMSGATE.—THE NEW CEMETERY.—The contracts for building the chapels, lodge, walls, &c., have been received by the board, and Mr. Wilson, builder, of Canterbury, is the accepted contractor for the erection of the chapels, for the sum of £1,882. Mr. Duckett's tender for the lodge and wall, at a sum of £2,400, was accepted; but at the meeting on Monday last a letter was read from Mr. Duckett, to which the clerk was instructed to reply, and inform him that the board was not prepared to entertain the proposals contained therein.

CAMBERWELL.—Another of the old landmarks in the south of London has just been doomed. The well-known market grounds of Mr. James Myatt, at Camberwell, have been cleared for building purposes. The land has been staked out for eight roads, and it is proposed to build 500 houses on the estate. A church is already in course of building. According to a recently-published account, it will require ten houses per day to be erected to meet the wants of our growing population; but we (*South London Press*) do not clearly see how this agrees with the 5000 empty houses said to be in existence within a four mile radius of the Elephant and Castle.

SHEFFIELD.—The great cutlery emporium of the world has just been brought into direct railway communication with London by the opening of a branch line, ten miles long, from the Chesterfield Station of the Midland Railway, to Sheffield. On the route from Chesterfield the following new stations have been erected:—Anston, Dronfield Abbey Houses, Ecclesall, and Heeley. The site of the new Sheffield station is in the Valley of the Sheaf, which was chosen because almost insurmountable engineering difficulties prevented the selection of a more central position. The building is of rock-faced wall-stone, tool-dressed, and the style of architecture Grecian, with Gothic headings. The roof is of iron and glass, and is supported by forty-two iron columns. The platforms are 700ft. long and 30ft. wide. At the north end of the building are two docks, and at the south end a covered-in dock. Four lines of rails run through the station.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

RECEIVED.—J. H.—A. H.—J. B. C.—Rev. J. W.—R. J. W.—T. W.—B. H. M. B.—Messrs. R. and Son—M. Bros—M. T.—R. J. W.—H. B.—F. G.—J. P. H.—T. W.—C. P.—C. and T.—M. and H.—C. C. R.—G. H. G.—P. and J. P.—P. P. N.—G. R. R.

MAC.—The question on "Macintosh" was inserted in mistake. It was intended for another journal.

C. S. S. JOHNSON.—Sketch of Window, Bath Street Independent Chapel, Glasgow.

GEO. BIDLAKE.—Please have sketch or sketches sent.

Correspondence.

PLYMOUTH GUILDHALL COMPETITION.

(To the Editor of THE BUILDING NEWS.)

SIR,—Mr. Lynn's letter in your impression of the 28th ult. deserves serious consideration; but it is a pity to mix up the question of "What is a referee?"—or, rather what a professional referee in the case of competitions should stipulate to be—with the details of the Plymouth competition.

The one is all important, and connected with the whole conduct of competitions, and will, I trust, be taken up by the Institute soon with energy and effect. Indeed, this competition question has been mooted more than once lately, particularly about four years ago; and it is only the pressure of other business which has prevented it being considered. The other matter is more of a personal one, and is referable to facts. These I will at once take up, for I feel—as your correspondent Mr. Lynn says—that a late hon. sec. of the Institute—unworthy though I am who held that office—should of all men be most alive to a proper sense of professional obligations.

Feeling this as I do, Mr. Lynn can now, perhaps, understand why I refrained from replying to his letter of the 26th October, where he allowed himself to make a most unworthy insinuation against me as to local influence. I have since stated in print, most distinctly, that I know not one of the Town Council, and have not a scrap of information beyond what I gather from an occasional Plymouth newspaper. The decision of the Council was without the slightest breath of influence from and was also a surprise to me, as, indeed, was Mr. Waterhouse's report. But to suppose that I should now object to the partial correction of what I might surely deem an injustice, without blaming anyone for unfair dealing, is simply puerile. Mr. Lynn has only to read the report of the debate on the award of the premiums to see how lucky he was to obtain any place at all. I have ventured elsewhere to express surprise that his design should have been selected because, however good in the abstract—and I admit it consists of a much finer set of architectural sketches than any others exhibited—it seems to me utterly out of place. I go so far as to think, and believe I have proved from the report and instructions, that my own design was the one most suitable for the purpose; and surely I am as entitled to this conceited idea as my opinion as anyone to theirs, especially as I found it upon the professional report, and do not pick a single hole in other designs.

However, the point is this—what did Mr. Waterhouse undertake to do, and what were the Council's instructions? What a referee *ought to do* is another matter, which I will argue separately. It may be well in future to define beforehand what a professional referee should or should not undertake to do, according to the opinion of the Institute; and that such was at least partially done between the Plymouth Town Council and their referee, is shown not only by Mr. Reid's letter, but also by the following quotations.

The original advertisement says, "The designs will be submitted to the Council, who will award the following premiums to the authors of the three best designs in the order of their approval." In the Instructions is the following:—"The designs to which premiums are awarded will alone be retained. . . . If any difficulty is felt in coming to a decision as to the designs to be accepted, the committee will call in professional assistance, but not otherwise."

All this, I suppose, because it was not then positively determined to build at all. This was made a municipal election question last November, and not decided in the affirmative till 12th of last month (January), when a decision also on the particular plan to be adopted was avoided.

It was not till after the designs had been publicly exhibited in July (as far at least as I know) that Mr. Waterhouse was called in (according to the words of the Committee of Council as reported in the newspapers of the 14th October last) "to report on the plans which have been received, to guide the Council in awarding premiums for the three designs."

Mr. Waterhouse's report begins thus:—

"I was favoured with your instructions to examine and report upon the designs, 25 in number, submitted in competition for the above buildings, and, after a careful examination of the whole, I had the pleasure of explaining in an interview with you the merits of *eight* which appeared to me most worthy of the premiums you have offered. I beg now, in accordance with your request, to report upon these eight in writing," and concludes in these words, "My own impression is that their" (the Council's) "selection must be made from among the eight I have remarked upon, and of which the first three seem to me decidedly the best."

Can it be imagined after this that the Council intended Mr. Waterhouse to be an arbitrator, and that they did not intend to exercise their own judgment in the matter? Whether this is a right state of things or not, I will argue elsewhere, but such are the *facts*, and one of the council actually "was sorry to find the architect had recommended certain plans for the premiums, as he thought that was a matter to be left entirely to the judgment of the Council."

It seems this gentleman—whom I do not in the least know, even by name, except as I read it in the newspaper—objected that Mr. Lynn's design was out of court, stated that the one now first premiated had its law courts too small, that my own design was good, and went on to recommend others.

Again. The Chairman of the Committee at the time, when proposing the adoption of the report as it was received from Mr. Waterhouse, said, "The position in which the council stood at the present time was not to decide whether the town should have a new guildhall or not; but whether the designs which had been selected by Mr. Waterhouse as being best adapted to their purpose, and possessing the greatest amount of architectural merit, should be awarded the premiums."

To conclude this, let me recommend Mr. Lynn to read again Mr. Waterhouse's report, and that gentleman's letter to THE BUILDING NEWS of 29th October, and also to compare the report of the same gentleman on the Cambridge Market Competition. So far for the Plymouth Competition. As to the general question, I will write further another time, feeling I have already occupied sufficient space.—I am, Sir, &c.,

C. F. HAYWARD.

20, Montague Street, Russell Square,
February 7, 1870.

MODERN STAINED GLASS IN WESTMINSTER ABBEY.

SIR,—Being about to stay with some friends in London at Christmas, I determined to renew my acquaintance with Westminster Abbey, in order to judge for myself as to the justice of "X. Y. Z.'s" strictures on the modern stained glass there, and contained in your columns a short time since. The weather on the occasion of my first visit not being favourable for a fair criticism, I had to wind my way to the old Abbey a second time, but for the cause of this second examination. I was not at all sorry, as it enabled me thus to judge of the effect produced on the interior of the church by the modern glass under two aspects—a bright day and a dark day.

Let me then at once say that I was quite shocked to find the Abbey (I had not been there since the insertion of the rose window in the south transept) disfigured by the introduction of the worthless productions that for the first time met my eye. The guide-book informs the visitor to whose art we are indebted for these windows—the names of *nearly all* our glass painters are included in the list—and all that can be said is that if they do not serve as a *caution* to the Dean and Chapter in particular, and the public in general, I shall indeed be surprised. The post-Reformation monuments in the church form, undoubtedly, a great obstacle to the general effect of the interior, but at all events many of them have considerable pretensions to art, and others do not, in themselves, offend the eye by vulgarity and grotesqueness. The Stephenson, Locke, Chaucer, and North Transept windows are particularly reprehensible; so much so that one can scarcely believe they were placed there with the sanction of the eminent architect to whom, I hear, the care of the church is entrusted. Take particularly the north transept windows; the one in the west aisle, erected to Admiral Hope, in which the subjects are so small that no one can decipher them; the six Crimean memorials, for which evidently that poor old gentleman on Gravesend Hill shot at by so many successive generations of Britons, placed in various postures, must have served as a model; and lastly, the one in which a sentimental-looking young lady playing the piano commemorates the late Mr. Novello. These lancets are very deeply recessed, and, if I remember rightly, contain some beautiful carving; this, owing to the obscurity caused by the colours of the glass, is utterly lost to the eye. The Brunel window did not impress me. Whilst the drawing is good, the colours appear of too sombre a hue; moreover, as "X. Y. Z." says, it is placed on the wrong side of the church, and is only seen during the better part of the day under the disadvantage of reflected light. The Chaucer window, whilst in itself a miserable effort, is undoubtedly of the type which the other windows should have assumed, as it is not *all* red, blue and green, but in this instance the makers appear to have dreaded the introduction of pure white glass *well* leaded, for the whole groundwork has the appearance of having been smudged over with a brownish tint, and this dirty tint predominates in a little window, filled up to the brim with colour, hard by.

A careful survey of the whole has forced this conclusion on me—viz., that modern glass painters aim at too much and too little. They aim at too much when, by confining themselves to imitating the old workers in the art, they endeavour to make their work pass for that of the golden period, and so miserably fail. They aim at too little in not pressing into their service that advanced knowledge of drawing which we possess, and of which their precursors, had they had the opportunity, would most assuredly not have been slow to avail themselves. The glass painter (at all events, English) of the present day fails in these cardinal points—a knowledge of drawing, and of the proper amalgamation and contrasting, by the use of white glass, of colours. He succeeds, and effectually, in shutting out that too little light of day with which we Northerners are blessed. One word as to the Prophets in the clerestory windows. Surely these gigantic figures are out of place here. I should like to know from what point one is to get a view of them, and whether, from the meaning of the word "clerc-story," it is consistent to fill the upper range of windows in a church entirely with colour?

Having written so much by way of condemnation, I hope you will allow me to say what pleasure I enjoyed in renewing my acquaintance with the dear old Abbey—at seeing how tenderly (in other respects than painted glass) it has been cared for of late. No simpler, but no better, work has ever been carried on there than the cleansing of dust, now almost finished, of the walls and columns. Would that the same method had been adopted elsewhere! Whilst the reconstructed choir is utterly unworthy of the place, the successful warming—all operations are hidden from view—and general cleanness of the interior are a credit to all concerned, and an example which others in authority elsewhere will do well to follow. Lastly, let me express my obligations to the vergers, a body of men only too often maligned—if we would but remember in how close contact they are continually brought with the British public, which is remarkable for being of a rather exacting turn of mind. The general politeness, attention, and evident interest in all of which they are the appointed guardians, greatly added to the pleasure with which I recurred to old scenes, and I could not but feel that they must be greatly influenced by the example of him who now, to the advantage of all, occupies the decanal chair at Westminster, and whose great qualities of mind and soul, care and interest for everybody and everything in any way connected with him, are so widely known.—I am, Sir, yours, &c.,

ALPHA.

Manchester.

P.S.—I wish you would persuade Mr. Bazalgette to remove those great erections of granite which occur on the Embankment where it joins the bridges. They appear to me most unsightly, and certainly are very inconvenient, as, for example, at Waterloo Bridge, where they contract the footway, and afford most objectionable corners. The pediments which are placed midway between the bridges look very handsome.

UNITING ENGLAND AND FRANCE.

SIR,—I beg to forward you a plan for a railway from Dover to Calais.

A bridge being the mode of communication proposed, this letter relates principally to the piers

or supports of the same. The essential characteristic of this plan is that such railway, or, rather, the piers supporting the bridge constituting the railway, can be built on land, and afterwards floated to their several positions, and then sunk and placed in their position by filling them with water. It is proposed that the piers be constructed of iron, that they be hollow, and something of the shape of a three-legged table turned upside down. The diameter of the bottom portion would be 300ft., the height of the piers or supports would average from 100ft. to 220ft., and the distance of the three piers or supports from each other, 150ft. One of the largest of such piers might be thus built (in sections) at, say, Birmingham, sent by rail to any convenient harbour, there put together and completed, and afterwards floated to its allotted position half-way between England and France, and then and there sunk and placed in position by filling it with water. When so sunk, it would remain firm and immoveable, and it is believed it would so remain for generations. Wherefore, a suitable number, say a few scores of such piers being made and existing between England and France, it is anticipated that a railway would simply forthwith follow as a matter of course. In order to complete the same, I propose that the bridge itself be constructed in any ordinary way, and that the same be simply level with the sea, or say a few feet higher than the highest waves. To provide for the shipping interest, a short wave-proof intersubmarine tunnel would be necessary, over which of course ships would pass in crossing the railway. Such a tunnel might be some 40ft. or 50ft. below the level of the sea. It might be about a mile or so in length, and situated in the centre of the Channel.

In conclusion, in order to carry out this great work—the greatest undertaking of either modern or ancient times—the greatest in the world, or in the world's history, I recommend that an International Congress of civil engineers be held in London in the ensuing spring. NAPOLEON.

MORTAR JOINTS.

SIR,—Some correspondence having appeared in your columns, with reference to Mr. Street's dictum on the subject of mortar joints, as reported in a lecture given by him before the Royal Institute of British Architects, a few words on the subject would not, perhaps, be considered inopportune.

The following remarks apply to mortar as used in brickwork, but the same will also apply to stonework, for the following reasons :—

1st. To guard against fracture, by ensuring an even distribution of the weight, notwithstanding any irregularities in their shape; from which it follows that the more perfect the bricks employed, the thinner the mortar joints may be; and again, the thinner the mortar joints are, the more carefully should the sand be sifted, or the mortar ground, in order to get rid of any hard substances such as pebbles, which would concentrate instead of distributing the pressure.

2nd. To render the joints proof against wind and rain; for which purpose they should be well flushed up solid with mortar.

3rd. To unite the bricks together, so as to form one solid mass. To perfectly attain this object, the mortar employed, besides thoroughly filling the joints, should be capable of setting to such a degree of hardness as to equal the bricks it is intended to cement together, both in its adhesive as well as its cohesive strength.

Mr. Street must excuse me when I say that, occupying the position he does in the architectural world, he ought to be more careful in giving vent to unqualified opinions, which cannot bear the test of scientific inquiry, and are likely to be taken up, and acted upon—to a length he possibly never intended—by many who, like sheep, are only too ready to follow any shepherd they may have made up their minds to acknowledge.

Take Roman bricks, and Roman mortar, and the reason for their thick mortar joints is at once apparent; the bricks were thin, and liable to fracture under any unequal pressure, whilst the mortar was coarse, and could not have been safely used with a thin joint.

In Roman and mediæval days, moreover, there were not the same facilities to be found as now, for grinding and reducing mortar to a sufficiently fine state to admit of thin mortar joints.

If the mortar or cement used is stronger than the bricks themselves, there can be no advantage in the point of strength, to be gained by increasing the amount of mortar, and diminishing the amount of brickwork; for the strength of a wall must be taken at its weakest part.

Thick joints, with slow setting mortar, lead to unequal settlement, and the squeezing out of the mortar beyond the face of the work, forming so many traps to guide the rain into the body of the wall. In olden times, I fancy, buildings were not run up so fast as in the present day, so that the mortar had time to harden before much weight was brought to bear on it.

Believing, as I do, in the common-sense builders of mediæval days, I cannot agree that they would have made any such specification with regard to the thickness of joints as that suggested by Mr. Street.—I am, Sir, R. E.

FURNITURE AND DECORATION.

SIR,—Permit me to offer a few remarks on the article in your last number headed "The Theory and Practice of Modern House Painting and Decoration, by an Experienced Workman."

I was disposed to think that the theory of art was the same from whatever point of view it might be regarded, but the writer of the above article has undeceived me. The conclusions which the advantage of "a workman's point of view" enables him to arrive at are somewhat startling, and, to one not similarly privileged, a little puzzling.

He commences by stating what I am not disposed to gainsay, that many thousands of even educated people are ignorant of the merest rudiments of the principles which should govern the application of ornament and colour to the embellishment of dwelling houses, and asks if there is any valid reason why this ignorance should continue. I think a sufficiently valid reason is to be found in his own words a little below. He says the educated and ignorant (in art) are alike pleased with works of art which are true in taste, the difference being, that the one can give a reason for his admiration and the other cannot. If the study of the theory of art only enables me to give a reason for my likes and dislikes, without directing them, it seems a folly to pursue that most difficult subject.

Again, I cannot agree with the writer that "Nature never makes mistakes." It is easy to imagine many cases in which "mistakes" may occur; *e. g.*, a piece of sea coast with a precipitous slope covered with vegetation, rising from the beach, forms a perfectly harmonious combination of colours; presently the slope slides down into the sea, and in place of the green we have a red cliff; the change cannot be immaterial.

He remarks that the decorative art of the ancient Egyptians is pure and simple, and peculiarly suited to their requirements, and *yet* so true, &c. Does he mean that purity, simplicity, and adaptation, are rather to be avoided than aimed at?

However, I can sympathise with him in his admiration for the "hedge bank, one mass of the richest vegetation," and I also agree with him that the beautiful forms if gathered and thrown in a heap are nothing but a mass of "sweltering vegetation," but this illustration is no more a proof that the work of the "eminent firm of upholsterers" he mentions is abortive, than taking an assortment of thin patterns and flinging *them* on the ground would be. He tells us no fault could be found with the work *as a whole*; so great a merit might have tempered the severity of his criticism, I think, but is not "An Experienced Workman's" one of the "commonest minds" of which he speaks? He *may* have an appreciation of the beautiful, but I doubt his capability of giving a reason for his discrimination.—I am, yours, &c.

H. B.

TECHNICAL EDUCATION AND THE WORKING CLASSES.

SIR,—Classes for the above were organised by the mine proprietors and engineers in the year 1868, at an extensive colliery district in the north, for the benefit of the working men in their employ; the subjects taught are Plane Geometry Projection or Solid Geometry, Machine Drawing and Building Construction. A large number of the working men availed themselves of the opportunity to improve and raise themselves in these branches of education, and the classes prospered, but only to a certain extent, the majority of the members having scarcely received the rudiments of the ordinary branches of education. Consequently there has been a considerable falling off in the session 1869 and 70, which is deeply to be regretted, as the subjects were brought before the classes so as to make them both popular and interesting. This is the great drawback to this system; the members to take an interest in it must be better educated before they can handle Algebraical signs and formulas, or be expected to solve practically any geometrical problem or calculation.

Another great objection to these classes consists in the arrangement and discipline connected with them. Several members are further advanced in the ordinary branches of education, and also in some of the subjects taught, such as machine drawing and building construction. Members who have, no doubt, passed a good training, and spent many years both in the drawing office, and on works in progress or finished; these are expected to commence and work up with those who have never had the slightest training or experience; these latter really stand a better chance of pulling through at an examination by the Science and Art Department than their more experienced brethren; examples of which occurred to my knowledge in the examinations last May. To improve all this, separate classes are required, so that these who can prove themselves qualified, could take advantage of them to go into the higher and more intricate walks of the professions which I am glad to acknowledge the science class masters are fully qualified to teach.

Our mining population, as a class, cannot be expected to take much interest in Technical Education, as they have to leave school and commence working at a comparatively early age, and after that their chances are very small indeed for attending either evening classes, or for self-culture; although we do, meet men amongst them, and not a few, who by their application and industry, have raised themselves into good positions in society, and in the respect of both their employers and fellow workmen.—I am, &c. TECHNICAL.

Feb 1, 1870.

SALFORD BRIDGE.

SIR,—In an article on "Architecture in Manchester," which appeared in THE BUILDING NEWS of January 21st, you say, regarding the Salford Bridge that it is an iron one with a very massive parapet of *real* or *sham masonry*. I beg to inform you that the parapet is of cast iron. Perhaps it may be useful for "W. Y." to know this. A. R.

THE GRANITE QUARRIES OF CORNWALL.

SIR,—A paragraph appears in yours of Jan. 28th, copied from the *West Briton* (the date when such appeared in that paper is not given). The statement conveys such a false impression that although it can be passed over in silence when appearing in that paper, yet when copied into journals of repute, and professional ones also, it requires that the other side of the question should be stated, and as the *West Briton* has earned for itself a notoriety by its persistent insertion of similar statements concerning the granite masons of this county, a brief statement of facts may prevent those out of the county, who are connected with the trade, from accepting and copying paragraphs written by ignorant people, who are ready to accept any reason for the present depression of trade that involves the workmen as the cause of such depression. In the first place, "I regret to hear," proves that "hearsay evidence" is a proof in the "correspondent's" mind that he is certainly benefiting the county by rushing into print with what he has heard. It may be true that many very important contracts have been "given to the French," but it seems queer that there is such an outcry about the French. What with the cotton, iron, and stone trades that we are informed have been "driven to France," we should imagine that country to be in a very flourishing state; but it appears that great depression exists in that country as well as here, and that there are thousands starving in France as well as in England. I should guess that the Trinity Corporation will have had enough experience of the French contracts by the time the lighthouse is completed which they "sent to France," and other contractors, which with a little concession on the part of working men, might have been obtained for Cornwall." Would you believe it if you were told, Sir, that Cornwall has the monopoly in granite? Many in the county believe that no other place has any right to a granite trade but dear old Cornwall, and if an employer is underbid in his tenders by contractors out of the county, why it's all the working men's fault. You can always hear parties who don't know the difference between fine and rough grit, talking quite learnedly about "Mr. So-and-So has lost another large contract—it's all the men's fault." But to the question of wages. The *West Briton* quotes 4s. 6d. as being the old standard of wages, but it might have gone further back, to the time when 3s., and even less, was the rate per day; for when the Thames Embankment started 5s. was the rate per day, then arose a great demand for granite masons, and employers adopted every method to obtain men. The county was flooded with "capitalists," who, eager to find employment for their capital, fancied that every hill contained a gold mine in the shape of a granite quarry, and only waiting for their capital to develop it. Old and useless quarries were reopened, new ones opened, where there was not the slightest chance of a profitable return for the outlay; then, having a "quarry," or "granite quarries," orders were obtained any way, and the demand for labour rose to such a pitch that men were sent out of the county to obtain a larger number, and the "strangers" came with the understanding that there would be no obstacles in the way to an advance of weges; other firms persistently advertised in local newspapers for men, and as a consequence of such competition, wages rose to 5s. 6d. per day; but even when the trade was at its highest pitch, the wages did not average 5s. per day, as it ranged from 5s. 6d. down to 4s., and a large majority were below the 5s. 6d., and only those who may be termed first-class men received that sum. When trade declined, and there appeared no probability of its revival, one of the old established firms spoke to their men on the subject, and informed them that if they would agree to a reduction of 6d. per day, they could then take orders which they would otherwise have to pass by. The men consulted together, and agreed to compromise the matter by the employers giving them two hours and an half on Saturday afternoons, or what is known as the Saturday half-holiday, on the men giving up the sixpence per day, the time worked on other days being in Summer from from 6 A.M., to 6 P.M.—This was agreed to by the masters, who delayed acting on it for some time, their reason being that when they found the men agreeable to the reduction, they would not enforce it until they were compelled by circumstances to do so. On this point, Mr. Cross, the manager of the Hyde-park memorial, stated about two years since that the masons of a firm in Cornwall had "petitioned their employers to reduce their wages," &c. Shortly afterwards, another letter appeared from the employès, stating that Mr. Cross was not correct in stating that the masons had petitioned for a reduction, but giving them credit for seeing the necessity of, and their acquiescence in, the reduction when it was proposed to them. Thus you see, that what the *West Briton* states to be the wages at the present time were reduced two years ago by *mutual agreement*. Since then, men who formerly received the 5s. 6d., have been again reduced, and are now working for 4s. 6d. per day, others are working for 3s. 6d., and less, whilst the highest rate in the county is 5s. Day work, it must be understood, is not the general rule, but only in yards where the finest and most complicated work is done—the quarries are all piece work, and as a general rule, the men have not averaged £1 per week, or anything like it, for the last two years.

It is further stated, "with the additional privilege of having all their tools sharpened at the expense of the employers." This would lead to the supposition that this was an extraordinary concession, but those connected with the trade are aware that, out of the county of Cornwall, it is a general rule for employers to sharpen masons' tools. This is what is done here in the case of day workmen, but piece workmen have not only to pay for the sharpening of their tools, but also to provide all of them, picks, spale hammers, axes, &c.

The new firms have almost all gone down, or are at present, in course of liquidation, whilst the men have been unable to obtain the money due to them. The Lundy Island Granite Co., though not properly speaking in the county, yet may be reckoned as such, is in the Court of Chancery, as is the Penryn Granite Quarries Co., Limited. The men have suffered from the loss of their money, and no doubt many of the shareholders have also, but there are so many of those "capitalists" in the county, that it would occupy too much time to refer to many of "the masters' works" lying "comparatively idle," but the old established firms have world-wide celebrity, and if quarries that have been in existence

for 39 years are compelled to be closed, as those at Crectown, reported in your journal of Dec. 31st, 1869, through "dulness of trade," what wonder is it if Cornwall feels the general depression. But "Cornish granite workers" are aware of the "laws of supply and demand," so that when such statements are made respecting them as the *West Briton* persists in making, journals of respectability should carefully avoid copying them before making inquiry into the truth of them.—I am, Sir, yours, &c.

A CORNISH GRANITE WORKER.

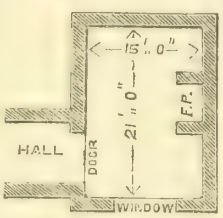
Cornwall, Feb. 5, 1870.

P.S. An advertisement appears regularly in your columns announcing that an old firm in this county have been selected to provide the granite for the new General Post-office, on account of the stone being remarkable for "its colour, quality, and price."

Intercommunication.

QUESTIONS.

[1764.]—SMOKY CHIMNEYS.—Would any of your readers kindly give me instructions how to cure a smoky chimney, the position of the door and window in the room being as per sketch?— J. P. H.



[1765.]— BRICKLAYER WORK.—Would one of your correspondents kindly explain the meaning of *birdsmouth* cuttings and *squint quoins*, used in bricklayers' work?—G. H.

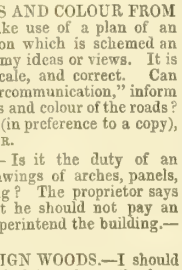
[1766.] — REMOVING MITES FROM BOARDS.—Is there any chemical solution that would remove mites from the floor and shelves of a cheese-room at a farm-house I occasionally visit? The boards of this room are literally crammed with them, they do considerable damage to the cheese, coming out in fabulous numbers when it is placed upon the floor. If through your valuable "Intercommunication," a remedy can be given for effectually getting rid of these troublesome animalculæ, it will confer a great boon on the farmer. The boards are strong, and the landlord does not care to go to the expense of a new floor.—SUBSCRIBER.

[1767.]—REMOVING INK LINES AND COLOUR FROM DRAWING PAPER.—I wish to make use of a plan of an estate, for developing the same, upon which is schemed an arrangement not in conformity with my ideas or views. It is a recent survey, plotted to a large scale, and correct. Can any of your readers, through "Intercommunication," inform me of a method to remove the ink lines and colour of the roads? I wish to make use of the plan itself (in preference to a copy), as being more accurate.—SUBSCRIBER.

[1768.]—INSPECTOR'S DUTY.— Is it the duty of an inspector to lay down full-sized drawings of arches, panels, &c., on wood or stone at the building? The proprietor says that is the architect's duty, and that he should not pay an inspector to do anything but to superintend the building.—T. L. W.

[1772.]—ENGLISH AND FOREIGN WOODS.—I should be obliged if any of your readers would let me know the bese book (and the price) on English and Foreign Woods. Ont that gives the most variety preferred.—ANTIQUARIAN.

[1769.]—CONSTRUCTION OF ROOF.—Perhaps some subscriber to your valuable journal will kindly inform me through the "Intercommunication" column of the best way of constructing a roof, the form of which I send a sketch of, and also the dimensions of the timbers. The span is about 40ft.—J. E. NEEDHAM.



[1770.]—FRAMING OF PARTITION.—Will some of your readers be kind eno ugh to settle the following question that has arisen between the clerk of works and foreman, as to the framing of a partition to carry one of the principals of roof?

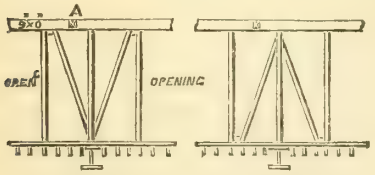


FIG. 1 FIG. 2

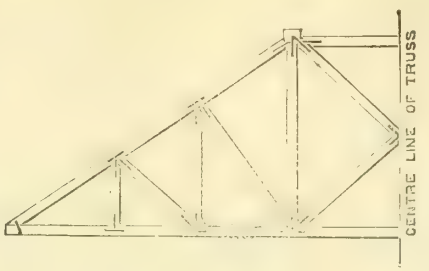
Which of the two methods, as shown, is best? Fig. 1 is the foreman's method, which is framed so as to carry the weight off the floor joists and throw it on the iron girder; this the clerk of works objects to as wrong, and has ordered it as Fig. 2, as he says he has yet to learn how an inverted truss can carry any weight without spreading. Does not method Fig. 2 throw the weight on the floor joists?—THE WORKING MECHANIC.

[1771.]—LEWES PRIORY.—May I ask if any of your numerous readers can tell me who is the owner of Lewes Priory so ably described by Mr. Walcott in your valuable paper of Jan. 28.—WALTER MIDDLETON.

REPLIES.

[1746.]—VERBAL ORDERS.—In cases where the contract contains a provision that no extra works will be paid for unless ordered in writing by the architect, the contractor cannot recover unless he has such written orders; neither is it sufficient that the contractor should obtain the written order after the work is executed, as it has been decided in the superior courts that such orders are not valid.—A. C. H.

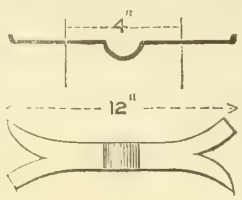
[1747.]—SCARFING BEAMS.—In the accompanying sketch, I have shown the best position for the scarfing of the



tie beam of the truss, under the especial circumstances mentioned by "Beginner." It should be along the line A B, that is, just halfway between the two vertical queen rods. In this position it will be subjected to the least amount of local strain.—C. P. P.

[1751.]—ALGEBRA.—Your correspondent, "Plus," cannot have a better treatise than "Colenso's Algebra." Unless he intends studying the higher mathematics, he will not require more than Part I. That is all that is demanded in the examination for an ordinary university degree.—GRADUATE.

[1754.]—ASHLAR WALLING.—A 4" cavity is ample in a hollow wall, and the two walls should be bonded together with wrought iron cramps, well tarred and built in, two to each superficial yard, with one stone of large area in each window or door jamb, the full thickness of the double wall. The stones of blocking course should be in long lengths, and cramped or dowelled together, and set in cement. —T. C. SORBY.



[1754.]—ASHLAR WALLING.—It is no wonder that walls built as described by "A. M. B. G." should speedily become distorted. Ashlar courses 9in. deep and only 5 on the bed are not "facing," but simply "veneering." When I was under articles, and had to copy out many a specification, it used to be distinctly stated that "no stone should measure less on the bed than in height." To expect to make a good bond between the backing of a wall and face courses consisting literally of stones set on edge, is a hopeless idea. The introduction of a few good bond stones here and there will be of little or no use. The face stones are not large enough either in height or on the bed.—P. S.

[1757.]—MAGNETIC AND TRUE MERIDIAN.—When the variation of the needle was first discovered by Norman and Burrough, in London, 1580, it was found that the magnetic axis deviated from a true meridian line as much as 11·15″ to the east. A few years afterwards it was discovered that the angle of deviation was slowly diminishing. In the year 1657, the needle appeared to lie in the deviation of the geographical meridian of London, and from that time to the year 1820, the needle advanced to the west; the variation was then 24·18″. The observation which was taken in 1838 indicated a variation of 24, and in 1852 it was about 22·16″. The α of Ursa Minor, or as it is more commonly called, Polaris, is about 1½° from the true pole, and revolves round it in 23 hours 56 minutes. When it is at its greatest distance, east or west, it is said to be at its eastern or western elongation. The true bearing of the pole-star, that is, the angle made at the centre of the earth between the true pole and the pole-star, is called polar azimuth. This, which should be taken at the time of its greatest elongation, depends upon the latitude of the place and the distance of the star from the pole. This distance is called the polar distance; it is subject to a small annual diminution, called precession, which is 19·3 seconds annually. In the year 1830 this distance was 1° 35′ 50″; by multiplying the number of years since by 19″·3, and deducting the product, the actual polar distance can be obtained. The azimuth, or angle of variation of the pole-star, can be determined by the following proportion:—As radius : sin. lat. : : sin. polar dist. : azimuth. Having obtained the polar distance to any day and place, in order to aseertain the angle of variation, or polar azimuth, find the time in the Nautical Ephemeris, when the star is about its greatest eastern or western elongation, and with a theodolite carefully observe when the star, having ceased to move in its first direction, begins to retrograde. Fix the telescope carefully in that place, and direct an assistant to take a stake with a lighted candle upon it, and put it down in the line at some 8 or 10 chains distance. This is the line of elongation; then say, as radius is to the whole distance, which must be carefully measured, so is the tangent of the angle of variation to the actual distance in feet, measured at right angles to the former. The line connecting this new point and the place where the instrument was, is the meridian line required. Take the bearing of this line, and the angle found between this and the magnetic north, becomes the angle of variation of the compass; besides the general or secular variation, there is a diurnal variation. It also varies more in summer than in winter; varies every hour of the day a little, most to the west at 11 o'clock. A magnetometer is also used by some to find the variation.—W. R. A., Uckfield.

[1757].—MAGNETIC AND TRUE MERIDIAN.—It is a very simple affair to ascertain the variation of the compass. Let "B. L." go into a tolerably level field and lay out a due meridian or true north and south line. The method of doing this easily and quickly has been shown in the "Surveying" articles in THE BUILDING NEWS. Having obtained this line, lay an ordinary magnetic compass in its direction, with the north and south points in line with it. Now range a short line in the direction of the needle, and measure the angle between them. The present variation is about 21° west, and is decreasing annually.—TRIG.

[1758.]—MEASUREMENT OF STONE WALLING.—The contract is evidently taken by "square measure," the wall being of a uniform thickness. A square pole or perch contains 30¼ square yards or 272¼ square feet, so that the work can be easily measured up. The perch, as far as the name is concerned, is becoming obsolete, no mention of it occurring in the recent text books giving weights and measures.—J. L. M.

[1760.]—DRAWING PAPER.—If the drawing paper be damped with benzine (which can be obtained at any chemist's), it will render it sufficiently transparent to enable "Tracing" to do what he requires; but I must say that it is an extremely unpleasant process in consequence of the peculiar smell of the fluid.—DRAUGHTSMAN.

STAINED GLASS.

ROME.—Among the costly public works carried on by the Roman Government, is the restoration of S. Paul's Church, which has been going on from the Pontificate of Leo XII. till the present day, and on which the average sum spent by this Government has been 50,000 scudi per annum—though not indeed without periods of interruption both to labour and outlay. Lately have been finished the painted windows, each with the colossal figure of an Apostle Prophet, or other saint, the twelve Apostles copied from the faded frescoes at the old Church of SS. Vincenzo ed Anastasio, at the Tre Fontane (site of S. Paul's martyrdom), which frescoes themselves are from Raphael's designs, executed by his pupils, but badly painted over by more modern hands. The above mentioned good examples of glass-painting were all prepared at the same factory, that of a manufacturer named Moroni; and they are the only painted windows in any Roman church deserving of notice, except some damaged specimens of such art, as was produced in the sixteenth century, in the Augustinian Church S. Maria del Popolo.

STATUES, MEMORIALS, &c.

PLANS for the fountain to be erected within the grounds in front of the Albert Institute, Dundee, were recently obtained from the architect, Mr. G. G. Scott, R.A., London, and estimates for the execution of the work have been received. In the course of a week or so, operations will, in all probability, be commenced. The area occupied by the lower basin of the fountain, which takes the quatrefoil shape, will be about 20ft. in diameter. The stonework rises to a height of 3ft. 3in. The basin will be moulded both at the lip and at the base; and in each segment of the quatrefoil will be a panel, ornamented with carved work. The masonry will be dovetailed, so as to give the basin solidity and power of resistance against the weight of water. From this ground basin, the fountain rises with three smaller basins, each taking the quatrefoil shape, to a height of 13½ft. The second basin—which stands 7ft. 6in from the ground, and is 7ft. 6in. in diameter—rests on a square pillar flanked by polished shafts of Peterhead granite, resting on bases of the Polmaise stone, and having foliated capitals. Round the lip of the basin is a moulding set with twelve carved heads of lions, from which the water will play into the lower basin. Over this, the centre pillar rises, having small detached square freestone shafts at each corner, and small circular granite shafts opposite each face, supporting the quatrefoil projection of the third basin. In the diagonal line of the square pillar, and outside of the square shafts just noticed, are placed four granite shafts of octagonal form rising from the intersections of the segments of the quatrefoil of the second basin, and supporting four gurgoyles which spring from the corresponding angles of the basin above. These shafts and pillars are neatly moulded and carved. The third basin stands 10ft. 3in. from the ground, and its greatest diameter is 5ft. The centre pillar over this basin is quatrefoil in plan, about 18in. in diameter, and has four small granite shafts clustered round it, with moulded bases and capitals. The top basin, in which will be a water jet, will be about 3ft. in diameter, and will be finished with a simple moulding. The supporting pillars to it are in mass, the carved capitals running into each other, so as to form a moulding for the base. The stone used will all be the Polmaise yellow rock, and the carving will be done by the architect's carvers.

BELFAST.—A stone statue of the late Prince Consort, in the robes of the Order of the Garter, was recently placed in a niche in the Albert Memorial Clock Tower, in High-street, Belfast. The statue is over 10ft. in height, and it is placed about 40ft. from the street.

WATER SUPPLY AND SANITARY MATTERS.

MICROSCOPIC ANALYSES OF THE ATMOSPHERE.—Dr. Syerson, F.L.S., read a valuable paper recently at the Royal Irish Academy, "On the Microscopic Character of Air in Towns, Country, and at Sea." Crystals of ammoniacal salts, fungi and vegetable spores, and crystals of common salts, characterised the specimens.

THE EAST LONDON WATER SUPPLY.—The report of Dr. Frankland, with regard to the polluted state of the water supplied by the East London Waterworks Company, was brought under the consideration of the Whitechapel Board of Works last week, and after some conversation on the subject, it was resolved that the clerk should write to the Board of Trade calling their attention to the issue of the inquiry made at their instance, and to the recent report of Professor Tyndall, at the same time desiring that an examination should be made into the condition of the reservoirs of the company at Old Ford, to ascertain whether the alterations which the company had engaged to carry out, so as to secure the water stored therein from contamination, had been so carried out.

STUDIES ON THE SEWAGE-WATER OF PARIS.—From a paper by M. Chevalet, in the *Bulletin de la Société Chimique de Paris*, we learn that the portion of the sewage soluble in water (the solid muddy deposit is converted into a kind of dry manure) contains by far the larger quantity of valuable ammoniacal salts, and retains in suspension nitrogenised organic matter, which it is never possible to obtain precipitated; there remains, moreover, similar organic matter in solution. The quantity of soluble ammoniacal salts amounts to 3·3‰1

kilos. to the cubic metre of sewage, and, in addition thereto it contains 610 grms. of azotised organic matter.

THE WATER SUPPLY OF CALCUTTA.—Calcutta has just received another important sanitary boon in the form of a supply of good water. The works, which are calculated to deliver six million gallons daily from a constant supply, are situated on the banks of the Hooghly, thirteen miles above Calcutta. The water drawn from the river is forced by engines into receiving or settling tanks, from which again it passes into filtering reservoirs containing layers of fine and coarse sand and pebbles. After filtration, the water passes into a covered well, and is thence carried by pipes to Calcutta.

THE SUBTERRANEOUS CANAL IN NAPLES.—The *Giornale di Napoli* says:—"The subterraneous canal destined to carry the waters of the Lake of Aguano into the sea is now completed, being 1400 metres in length. This work, one of the most useful of those undertaken in late years by private persons, has been accomplished in spite of enormous material difficulties and considerable opposition."

THE BECKENHAM SEWAGE.—On Thursday next there will be a conference between the Beckenham authorities and the Lewisham District Board of Works, with respect to the long agitated question of the Beckenham sewage.

LAND AND BUILDING SOCIETIES.

THE IMPROVED INDUSTRIAL DWELLINGS COMPANY.—The directors, in the report of their proceedings for the half-year commencing 1st July, and ending 31st December, 1869, state that a further sum of £67 19s. has been expended on buildings now completed, and £6736 9s. 1d. on works in progress, making an expenditure of £6804 8s. 1d. during the past half-year, and a total expenditure of £133,855 0s. 3d. since the formation of the company on capital account. The gross rents received during the past half-year amount to £6657 7s. 10d., and after paying all charges, and crediting the proper amounts to the repairs and leasehold redemption funds, there is a net profit of £3606 10s. 7½d. The sum of £5229 13s. 7½d., which includes £1623 3s. brought forward from the last half-year, is available for division among the shareholders, but the directors recommend that a dividend at the rate of 5 per cent. per annum only be paid—which will absorb the sum of £2944 13s. 9d.—and that the balance, viz., £2284 19s. 10½d., be carried forward. There has been no diminution in the rental at the several estates during the half-year; but owing to the continued great depression of trade at Greenwich and at the east end of London, no improvement has taken place in the occupation of Nelson-buildings, at Greenwich, and Tower-buildings at Wapping. The directors hope, however, that the opening of the East London Railway station in the immediate vicinity of the latter buildings, may be the means of filling the tenements now empty. Five blocks of buildings are in course of erection at Ebury-street, Pimlico, on a portion of the estate of the Marquis of Westminster. These buildings will provide 110 tenements of two and three rooms each, and ten large shops; and will accommodate about 600 persons of all ages. The directors hope that these dwellings will be completed and occupied before Michaelmas next. The negotiation with the late Marquis of Westminster, referred to in the last report, for the lease of a site in Ebury-square, Pimlico, has been completed, and 65 dwellings, with 4 shops, affording accommodation for about 330 persons, are already in course of erection. The directors hope that these dwellings will also be completed and occupied before Michaelmas. The 54 additional tenements at Waterlow-buildings, Bethnal-green, are nearly completed, 25 being already occupied by eligible tenants. The contract time for the erection of the buildings will not expire until March next. These buildings have been constructed on a new plan, and being much approved by the tenants, the directors contemplate a further outlay on the same principle.

THE UNITED LAND COMPANY (LIMITED).—The annual general meeting of the shareholders of this company was held at the offices, No. 33, Norfolk-street, Strand, last week. The report of the directors was submitted as to the operations during the past financial year ending Dec. 31, 1869, together with the balance-sheet of the income and expenditure and of the liabilities and assets for the same period. Since the last annual report the following estates have been purchased by the company:—Sheerness (No. 2), Harrow-road and Kilburn, Hammersmith, and Portsmouth (No. 2). The Harrow-road and Kilburn estate and the second portion of the Wellingborough estate were to be offered for sale in the early spring. The total sale of land from March 21 to Dec. 31, 1869, as per balance-sheet, was £47,005 12s. 3d. The directors announced that, after clearing off the current working outlay, and writing off the sum of £750 from the preliminary expenses, and providing for every charge against revenue, including the interest of 5 per cent. fixed for calls paid in advance, they were enabled to declare a dividend on the called-up capital at the rate of 5 per cent. per annum free of income tax for the five months ending 31st December, 1869 (the four months to July 31st having been already paid by the interim dividend declared on the 26th July, 1869), and in addition a bonus at the rate of 5 per cent. per annum for the nine months ending December 31st, 1869. The shareholders, therefore, will be paid a total dividend of 10 per cent. per annum, leaving a balance to be carried over to next year's profit and loss account. The first issue of 10,000 shares having been all taken up, the directors have announced a second issue of 10,000 shares without premium. When the whole of the shares of this second issue are taken up, the directors cannot undertake to pledge themselves, as regards any further issue of shares, that they shall be offered at par.

LONDON PERMANENT BUILDING SOCIETY.—The annual report of the London Permanent Benefit Building Society refers to satisfactory additions to the number both of the society's members and shares. After payment of all expenses, and interest on loans, a profit of £3382 19s. 5d. has been realised; of this amount £3253 6s. 2d. has been placed to the credit of the members in respect of their deposit shares, being interest at the rate of £6 per cent. per annum on their paid-up capital; and £129 13s. 3d. has been added to the reserve fund, which now amounts to £1336 3s. 7d.

ROSS (HEREFORDSHIRE).—The twentieth annual meeting of the Ross and Archenfield Building Society was held on the 3rd inst. The balance-sheet attached to the report showed that with a balance from 1868 of £627 19s. 10d. a total of £1530 12s. 2d. had been received, and £998 12s. 8d. paid, leaving a balance in hand of £521 19s. 6d. The contingent fund or expenses account showed that with a balance from 1868 of £42 9s. 1d., a total of £153 10s. 1d. had been received, and £129 16s. 5d. expended, leaving a balance of £23 13s. 8d.

Our Office Table.

LONDON AND COUNTY BANK.—At the usual half-yearly meeting of the proprietors of the above bank on the 3rd inst., in presenting the balance-sheet of the bank for the half-year ending the 31st December last, the directors reported that, after paying interest to customers, and all charges, allowing for rebate, and making provision for bad and doubtful debts, the net profits amount to £87,669 19s. 10d. This sum, added to £6225 17s. 7d., brought forward from the last account, produced a total of £93,895, 17s. 5d. The usual dividend of 6 per cent. for the half-year was recommended, together with a bonus of 2½ per cent. both free of income tax, which would absorb £85,000, and leave £8895 17s. 5d. to be carried forward to profit and loss new account. The present added to the June dividend will thus be 17 per cent. for the year 1869. The position of the London and County Bank, now so firmly established, and the handsome dividend its capital returns, must be especially gratifying to the shareholders at this period, when we are only just recovering from a financial crisis.

CHESTERFIELD STEEPLE.—A contemporary, in describing the new Midland branch line from Chesterfield to Sheffield, says that travellers will not fail to remark, on leaving Chesterfield, the extraordinary steeple of its parish church, which is built in such a fashion that it somewhat resembles an old-fashioned conical-shaped nightcap, the upper part of which had been twisted out of the perpendicular by the hand of its wearer. Various traditions survive as to the reasons which induced the architect of this eccentric specimen of ecclesiastical edifices to depart so far from the path of rectitude in the construction of the steeple. According to one account, the unseasonable parsimony of his employers so much irritated the local Wren that he spleenfully determined upon this singular method of immortalising and revenging their niggardliness. Another version is to the effect that the architect, having once heard from somebody a second-hand description of the famous leaning tower of Pisa, resolved to built his steeple in a sort of humble tumble-down imitation of the great original—to which it bears no resemblance whatever. A third, and perhaps not themost unveracious of the traditions, asserts that the bend sinister and singular which makes this steeple absolutely unique in the land was but the result of an accidental deviation from the straight measurements and plans of the architect.

OPENING OF THE TOWER SUBWAY.—It is announced that the Tower Subway will be opened for public traffic in the course of a week. It is stated that passengers will be conveyed from one side of the river to the other through the subway in three minutes, and that the fares will be 1d. second class, and 2d. first class. The entrance on the City side is on the lower part of Tower-hill, near Lower Thames-street, opposite the Tower gates; and that on the Surrey side close to Tooley-street.

BADLY-MADE ROADS.—At the last meeting of the S. George's (Hanover-square) Vestry, it was resolved, on the motion of Mr. Walker, "That the parish do not undertake the care of any footway, roadway, mews, or sewers, until the surveyor of the Vestry has certified that the same has been properly constructed, and his certificate has met with the approval of the Vestry." Mr. Walker said that the Committee of Works had found that certain streets had crept in which ought never to have been taken to by the parish. He instanced S. George's-mews and Ebury-mews, and other places built by speculating builders, which had roads very badly made, badly drained, and sewers almost as bad as cesspools. The property was sold to others, and in a few years the Vestry was called upon to make repairs.

DILAPIDATED HOUSES IN MARYLEBONE.—At the last meeting of the Marylebone Vestry, the clerk reported that the order for the demolition of the houses in York-court (of which Lord Portman is the freeholder), made by the Vestry under the Artizans' and Labourers' Dwelllngs Act, had been disregarded, although three months had elapsed. It was asserted that it was the duty of Lord Portman to take them down, but the clerk said he had been officially informed that his lordship would take no steps in the matter. The medical officer said he visited the houses on Wednesday last, and "they were in a most awfully horrible condition." There was no water on in the houses; they were gradually being pulled to pieces by the inhabitants; and on account of their condition three of them were tenantless. The vestry thereupon resolved that the vestry clerk take steps for the demolition of the houses, first taking legal advice on the matter.

DANGEROUS PROXIMITY OF CHRISTMAS DECORATIONS TO GAS.—An occurrence which might have resulted in a calamity similar to that of a few weeks back at Liverpool, took place on Sunday evening in the new church of the Holy Trinity, North Ormesby, near Middlesbro. Just before the sermon, fire broke out near the gas-light, just over the priest's head, causing a general panic. The alarm had arisen through the gas setting fire to the Christmas decorations, which had not been taken down, and were in a very dry condition. For a time they blazed against the clerestory windows in an alarming way, filling the edifice with smoke and threatening serious damage. One of the churchwardens, however, ascended the pulpit, and succeeded in beating out the fire.

LAMBETH WORKHOUSE.—The plans for Lambeth Workhouse have been received, and there have been selected as adjudicators thereon, Messrs. Pocock, Hunt, Snell, Currey, Taylor, Dawson, Waterhouse, Tress, and Jarvis. From these a referee was selected by the competing architects, to whom a fee of 50 guineas will be paid, and who will have to decide as to which are respectively the first, second, and third plans in order of merit. Mr. Currey, the architect for St. Thomas's Hospital, has been unanimously elected by the competitors.

Chips.

We hear that a new wing is about to be added to King's College Hospital.

"The Grove"—the pride of Camberwell—has been thrown into great consternation by the felling of some of its largest and finest-looking trees—a step necessitated from the fact that, though looking quite healthy, they were "rotten at the core." Leakage from the gas-mains is assigned as the reason of their premature decay. It is very difficult to get young saplings to grow in the soil to supply the place of the trees felled.

The Viceroy of India has applied to the Home Government to send out a civil engineer, possessed of special experience, to be employed in examining the coast of India, with the view of discovering sites for ports.

The ninth annual exhibition of the works of modern painters was inaugurated at Glasgow by a full dress conversazione on Monday, 31st January. The exhibition is one of great excellence, and includes, among many others, works of the following artists:—Turner, Linnel, Danby, Sir Noel and Walter H. Paton, Portaels, Faed, Erskine Nicol, Mrs. E. M. Ward, and Madame Ronner.

At the last meeting of the Paddington Vestry, it was announced that the Metropolitan Board of Works had given a conditional sanction to the Vestry contributing £500 towards the cost of the proposed bridge over the Grand Junction Canal from Carlton-terrace to Kensal Road.

The remains of a fossil serpent, about 30 feet long, and of a species new to science, has just been found in the Eocene greensand of New Jersey, U.S.

The Rev. T. F. Hooks, M.A., Secretary of the London Diocesan Church Building Society, has been appointed to the living of Holy Trinity, Brompton.

It is stated that the parties with a capital ready to build a new lyrical theatre in London have failed to obtain a site.

MEETINGS FOR THE ENSUING WEEK.

MONDAY.—South Kensington Museum. "On Ornamental Ironwork." Lecture II. By J. M. Capes, Esq. 8.
" Royal Institute of British Architects. An examination of Mr. Ruskin's "Architectural Criticism." By E. Hoole, A.R.I.B.A.

TUESDAY.—Institution of Civil Engineers. 1st.—Discussion on "Railway Expenditure and Income. 2nd.—Mhowkee Mullee Viaduct, G.I.P. Railway. By A. R. Terry, Associate Institute of C.E. 3rd.—The Pennair Bridge, Madras. By E. W. Stoney. 8.

WEDNESDAY.—Society of Arts. "On Emigration." By T. Plummer, Esq. 8.

THURSDAY.—Society of Antiquaries. 8.30.
" Linnean Society. 8.
" Royal Institution. "On the Chemistry of Vegetable Productions." By Professor Odling, F.R.S. 3

FRIDAY.—Royal Institution. Lecture by W. K. Clifford, Esq., B.A. 9.

SATURDAY.—Associated Arts Institute. Conversazione.
" Royal Institution. An Introduction to the "Science of Religion. By Professor Max Muller, M.A., LL.D. 3.

Trade News.

WAGES MOVEMENT.

It is announced upon authority that the Welsh iron masters have agreed to grant an advance of 10 per cent. in wages, the same to take effect at the end of February.

TENDERS.

COPPLESTONE, DEVON.—For building a group of cottages and bakehouse for T. Moon, Esq. Mr. S. Hooper, Hatherleigh surveyor:—

Inch	£480 12
Howard	452 0
Arscott	450 0
Parish	433 0
Edwards and Avery	406 10
Parish, jun.	396 10
Stratford	392 0
Ball	390 0
Bidgway	354 10
Ellacott and Wollaway (accepted)	323 0

HAMMERSMITH ESTATE.—Drainage and road works:—

Strickson	£700
Coker, jun.	695
Blackmore	670
Wigmore	600
Young	588
Pizzey (accepted)	531

MUSWELL HILL ESTATE.—Drainage and road works:—

Young	£905
Pizzey	880
Strickson (accepted)	740

ST. JOHN'S, ISLINGTON.—Alex. J. Scoles, architect:—

Carter and Sons	£1750
Sutton	1600
Castle	1500
Winship	1350
Cubitt and Son	1100

TORRINGTON, DEVON.—For building new detached infirmary, and repairing the union workhouse. Mr. S. Hooper, Hatherleigh, surveyor. Surveyor's estimate, £800:—

Halls and Bulleid	£917
Howard	855
Hookway and Pethrick	828
Cock, Grant, and Eastmond (accepted)	805
Shepherd and Co.	785
Bale and Sons	695

TORRINGTON, DEVON.—For building a new chapel and chancel at the union workhouse, for J. C. Moore Stevens, Esq. Mr. S. Hooper, Hatherleigh, surveyor. Surveyor's estimate, £500:—

Bale and Sons	£635 0
Cock, Grant, and Eastmond	533 0
Shepherd	520 0
Howard	498 10
Hookway and Pethrick (accepted)	492 0

WEST HILL ESTATE, WANDSWORTH.—Roads:—

Young	£2305 0
Robinson	2050 0
Wigmore (accepted)	1725 10

WEST LONDON ESTATE, No. 2.—Drainage and road works:—

Pizzey	£545 0
Young	530 0
Strickson	500 0
Coker, jun.	490 10
Wigmore	450 0
Blackmore (accepted)	423 0

WILLESDEN ESTATE.—Roads:—

Pizzey	£450
Young (accepted)	436

COMPETITION.

WELLBOROUGH LOCAL BOARD, March 7.—For plans and general specifications for laying out a market and market buildings. 1st premium, £25; 2nd, £15. Mr. H. M. Barber, Clerk to the Board, Newton Abbot, Devon.

CONTRACTS OPEN FOR BUILDING ESTIMATES.

CHICHESTER CATTLE MARKET, Feb. 15.—Contract No. 1.—For the laying out of the site of a cattle market, of about 6 acres in extent; comprising the metalling of the pens, standings, and roads, the construction of the drains, boundary walls, and entrance gates, and the removal and alteration of certain houses on the site of the market, together with the formation of a new road, and the diversion and covering of a portion of the Lavant course, and other works connected therewith. Edward Arnold, Town Clerk, standings for cattle, together with the wrought iron tethering-rings for horses and cattle. Edward Arnold, Town Clerk, Chichester.

ST. GEORGE'S HANOVER-SQUARE, Feb. 19.—For the supply of flints and gravel, Guernsey granite, masons' and paviors' work, supply of paving materials, workmen's tools, gasfitters' work, drain pipes, &c. Mr. J. H. Smith, Vestry Clerk, parish of S. George, Hanover-square.

CONVICT PRISONS, Feb. 26.—For the supply of ironmongery, cutlery, tin ware, and various other stores. The Directors of Convict Prisons, 44, Parliament-street, S.W.

WAR OFFICE, Feb. 24.—For the supply of materials and the performance of work at Sheerness Tower on Grain Spit, and Isle of Grain and Slough Forts. The War Office.

ISLE OF WIGHT, Feb. 23.—For the repair of the roads and highways, and other works, in the districts of the East and West Medines for three years. Commissioners of Highways, Guildhall, Newport.

ST. SAVIOUR'S DISTRICT BOARD OF WORKS, Feb. 17.—For paving the carriage way in the districts of St. Saviour's and Christchurch, and for watering the roads. H. Sturmy, Clerk, Emerson-street, Bankside.

CHATHAM, Feb. 14.—For bricklayers', masons', paviors', carpenters', plasterers', slaters', plumbers', smiths', painters', and gasfitters' work. Royal Engineer Office, Chatham.

DONCASTER, Feb. 18.—For erecting a chapel of ease, in Christ Church parish. Plans of Mr. B. S. Brundell, 1, Princess-street, Doncaster.

ORSETT, ESSEX, Feb. 16.—For additions and alterations to the Workhouse. A. H. Hunt, Clerk, Work-Romford.

BRADFORD, Feb. 28.—For the construction of a service reservoir at Horton Bank Top. W. T. McGowen, Town Clerk, Corporation Office, Bradford.

KENDAL SEWERAGE, Feb. 26.—Contracts No. 1 and 2.—For the construction of brick and pipe sewers and drains, with manholes, storm outlets, ventilating shafts, river crossings, sewage tanks, and other works. Contract No. 3.—The supply and delivery of earthenware sewer and drain pipes, bends, junctions, gullies, traps, inverts, and other materials. Contract No. 4.—The supply and delivery of quantity of cast-iron pipes, girders, manhole covers, ventilating grates, gullies, and other castings. Town Clerk, Town Hall, Kendall.

YEOVIL, Feb. 24.—For the restoration of the church of St. Catherine, Montacute. Mr. Henry Hall, architect, 3, Bloomsbury-place, Bloomsbury-square, London.

RIPLEY, Feb. 18.—For certain alterations and additions to Ripley House, near Weybridge, Surrey. Mr. James K. Colling, 150, Hampstead-road, N.W.

HUCKNALL TORKARD (Notts), Feb. 28.—Local Government Act, 1858.—For the construction of the several works required for the drainage of certain portions of the district under their control. John Godber, Chairman. Countersigned, C. J. Spencer, Clerk.

BOROUGH OF MARGATE, Feb. 21.—For the supply of forty tons of 9in. by 4in. granite sets ("Pitchers.") W. Brooks, Town Clerk, Town Clerk's Office, Margate.

GAYTON (Stafford).—For the restoration and enlargement of St. Peter's church. Architects, Messrs. Wm. G. Habershon and Pite, 38, Bloomsbury-square, London.

GREENWICH, Feb. 23.—For constructing 410ft. run of 3ft. by 2ft. brick sewer, 730ft. run of 15-inch pipe sewer, and 930ft. run of 12-inch pipe sewer, and other works, in Tyrwhitt-road, Albert-road, New-road, and Tressilian-road, in the parish of St. Paul, Deptford. E. W. James, Clerk to the Board, Greenwich.

BATH STONE OF BEST QUALITY.

RANDELL and SAUNDERS, Quarrymen and Stone Merchants, Bath. List of Prices at the Quarries and Depots; also Cost for Transit to any part of the United Kingdom, furnished on application to Bath Stone Office, Corsham, Wilts.—[ADVT.]

BANKRUPTS.

(Act 1869.—To Surrender in the Country.)

William Fisher, Lewisham and Blackheath, decorator, Feb. 21, at 2—William Knight, Horwich, near Bolton, brick and tile manufacturer, Feb. 16, at 10—Frederick Southcoates, Everton, joiner, Feb. 16, at 2—Stephen Fletcher, Prestwich, near Manchester, builder, 21, at 11—Charles Henry Whaites, North Elmham, Norfolk, brickmaker, Feb. 22, at 12.

SITTINGS FOR LAST EXAMINATION.

May 10, R. W. Pallett, North-street, Camden-grove North, Peckham, builder—May 10, J. Ingle, Gutter-lane, City, gasfitter—May 10, E. Wills, Absalom-road, Upper Westbourne Park, carpenter—May 10, J. Howick, Hove, builder—May 10, S. Cripps, Watford, builder—May 13, A. Cumberland Stratford, brick merchant—May 27, W. H. Everest, Turner's-road, Limehouse, carpenter—May 27, G. P. Mann, Swanscombe-place, Shepherd's-bush, bricklayer—May 27, E. Mesher, High-street, Fulham, builder—May 27, E. J. Thurlow, Carlton-road, Kentish Town, builder—May 27, W. Weller, Woolwich, stone, mason—March 2, J. Coleman, Faraday-road, Notting-hill, carpenter—March 2, E. Hunnings, St. Thomas-road, Holloway, plumber—March 1, J. H. Bray, Alexander-road, Kilburn, builder—March 1, A. Castle, Sunbury-common, mason and builder—March 2, T. Gantlett, Clarendon-street, Pimlico, and Carnaby-street, gas fitter—March 2, E. B. Bristow, Twickenham, carpenter—March 18, W. Mansfield, Birmingham, brickmaker—Feb. 16, T. Worthington, Lampeter, lime, timber, and coal merchant—Feb. 25, J. Thomas, Newport, Monmouthshire, stonemason—Feb. 25, T. Davies, Mountain Ash, builder—Feb. 28, W. W. Lewis, Dinas, Glamorganshire surveyor—Feb 28. H. Hughes, Bristol, house decorator—Feb. 28, S. Cowlin, Bristol, builder—Feb. 24, H. V. Martin, Leeds, brickmaker—Feb. 9, J. Wilson, Scarborough, builder—March 23, E. Miller, Leicester, brazier—April 26, H. Gilbert, High-street, Notting-hill, timber merchant.—May 31, W. Rayner, Walpole-street, New-cross, builder—March 8, J. Cobden, Hornsey-park-road, builder—March 8, D. Wright, Princess-street, Stamford-street, glass manufacturer—March 8, D Sale, Devonshire-street, Queen-sq., builder—March 9, O. J Powell, Cleveland-street, Camberwell, paper hanger—Feb. 23, E. Tudor, Bradford, Lancashire, plumber and glazier—Feb. 22, W. Eddy, Gosport, plumber and glazier.

DIVIDEND MEETINGS.

Feb. 17, W. Roberts, Ecclesfield, file and steel manufacturer—Feb. 17, G. Tilfourd and J. Mitchell, Sheffield, Engineers.

SCOTCH SEQUESTRATIONS.

George Gray, Portsoy, wood merchant, Feb. 15, at 11—Eliza Long or Anderson, Forres, painter. Feb. 14, at 12—James Roy, Nairn, carpenter, Feb. 14, at 12.

PARTNERSHIPS DISSOLVED.

Radcliffe and Kershaw, Halifax, stone masons—Wilkinson and Harris, Coventry, carpenters—Walmsley and Co., Bury fire brick and tile makers—Lark and White, Strood and Bankside, cement manufacturers—J. and G. Whitcombe, Petworth, builders—J. and J. Hill, Bristol, timber merchants.

LATEST PRICES OF MATERIALS USED IN CONSTRUCTION.

TIMBER. Duty 1s. per load; Drawback, 1s.

	£ s.	£ s.
Teak.....load	11 0	12 0
Quebec, red pine	3 15	4 15
,, yellow pine..	4 0	4 10
St. John, N.B. yellow	0 0	0 0
Quebec oak	6 0	6 10
,, birch	4 0	5 0
,, elm	4 5	5 10
Dantzic oak	4 5	6 10
,, fir	2 10	4 0
Memel fir.....	2 10	3 10
Riga	2 15	3 0
Swedish	2 6	2 10
Masts, Queb. red pine	3 10	6 0
,, yellow pine ..	4 5	6 0
Lathwood, Dant. fm.	4 0	6 0
,, St P'burg.	6 0	6 10
Deals, pr C., 12ft by 3 by 9 in. duty 2s. per load, drawback 2s.		
Quebec, white spruce	12 10	17 10
St. John, white spruce	12 0	15 0
Yellow pine, per reduced C.		
Canada, 1st quality..	18 10	19 10
2nd do.....	13 0	13 10
Archangel, yellow ..	10 10	12 10
St. Petersburg, yel...	11 10	12 10
Finland	6 5	7 10
Memel	7 0	9 0
Gothenburg, yellow	8 0	9 10
,, white ..	0 0	0 0
Gefle, yellow	9 0	10 10
Soderham	8 0	9 10
Christiania, per C., 12 ft. by 3 by 9 in. yellow	10 0	12 10
Flooring Boards, per sq. of 1in., first yel.	7 6	10 6
First white.....	7 0	9 6
Second qualities	6 0	7 0
PUMICE STONE per tn	6 0	8 0
OILS, &c.		
Seal, pale .. per tun	42 0	0 0
Sperm body.....	87 0	88 0
Cod.....	39 0	0 0
Whale, Sth Sea, pale	39 0	0 0
Olive, Gallipoli.....	60 0	0 0
Cocoanut, Cochin, tun	45 10	0 0
Palm, fine	40 10	0 0
Linseed	31 0	0 0
Rapeseed, Eng. pale..	44 0	0 0
Cottonseed	30 0	37 0

METALS.

LEAD:—

Pig, Foreign .....per ton	18 7 6	0 0 0	
,, English, W.B.	do.	19 10 0	0 0 0
,, Lead Co.	do.	19 5 0	0 0 0
,, Other brands	do.	18 15 0	19 0 6
Sheet Milled	do.	19 5 0	19 10 0
Shot, Patent	do.	22 0 0	0 0 0
Red or minium	do.	20 10 0	0 0 0
Litharge, WB	do.	0 0 0	0 0 0
White dry	do.	26 0 0	28 0 0
,, ground in oil	do.	26 0 0	29 0 0

COPPER:—

British—cake and ingot .....per ton	70 0 0	70 10 0	
Best Selected.....	do.	71 10 0	72 10 0
Sheet	do.	76 0 0	78 0 0
Bottoms	do.	79 0 0	80 0 0
Australian	do.	73 0 0	74 10 0
Spanish Cake	cash	0 0 0	0 0 0
Chili Bars	,,	66 10 0	67 5 0
,, refined ingot.....	,,	69 15 0	71 10 0
Yel. Metal Sheathing & Rods .....per lb.		0 0 6½	0 0 6¾

IRON:—

Pig in Scotland..... cash	per ton	2 15 6	0 0 0
Bars Welsh in London	do.	7 5 0	7 10 0
,, in Wales	do.	6 12 6	6 15 0
,, Staffordshire	do.	8 0 0	8 7 6
Rail, in Wales	do.	6 15 0	7 5 0
Sheets, single in London	do.	10 0 0	10 5 0
Hoops, first quality.....	do.	8 15 0	9 5 0
Nailrods	do.	8 0 0	8 10 0
Swedish Bars	do.	9 15 0	10 5 0
QUICKSILVER.....per btl.		6 17 0	0 0 0
SPELTER, Silesian .....per ton		18 15 0	19 0 0
English, V and S.....	do.	19 5 0	0 0 0
ZINC, dutto sheet.....	do.	24 0 0	0 0 0
STEEL, Swedish keg.....	do.	15 0 0	15 5 0

TIN:—

Banca .....per ton	114 0 0	0 0 0	
Straits, fine..... cash	112 0 0	0 0 0	
,, for arrival	0 0 0	0 0 0	
English blocks	110 0 0	112 0 0	
,, bars.....	111 0 0	113 0 0	
,, refined, in blocks	112 0 0	114 0 0	

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The Governors are prepared to LET on LEASE, for 84 years, PORTIONS of their ESTATE, for building purposes. There is ample railway communication, and special educational advantages in the new College are secured to occupiers of houses on the estate. For plans and particulars apply to Charles Barry, Esq., 1, Westminster-chambers, Victoria-street, S.W., architect and surveyor to the Governors.

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T. J. WESLEY BENNETT, Secretary.

THE BUILDING NEWS.

London, Friday, February 18, 1870.

PROTESTANTISM AND THE CONVENTIONAL CHURCH TYPE.*

(*Continued from page* 101.)

In at least two out of every three of these thin iron-column churches, the "design" consists of the expedients just described. The front is narrowed by projecting towers or recessed angles; on the sides, gablets scattered with on unsparing hand try to conceal the crushing magnitude of the roof; and the whole is "sweetened" by the liberal use of tracery and other decoration. In certain cases, indeed, a better judgment has shrunk from this ludicrous discrepancy between general form and detail, and has taken refuge in a naive simplicity by no means displeasing. Such examples, for instance, as Garden-street Chapel, Sheffield and Dronfield Independent Chapel, show the sort of harmony thus attainable. And if the designers of these barn-like buildings generally are prepared to stop at this point, these works, if not beautiful, need not be vulgar. But if they intend to cultivate external architecture, it cannot be too strongly insisted on that its indispensable groundwork is *good general form*. What opportunity, then, for such force does the next mode of roofing on our list present? This, it will be remembered, is the longitudinal roof over the middle aisle, with short transverse roofs over each bay of the side aisles. It is the plan tried long ago at Haggerston, and in some other of Mr. Blomfield's earlier churches, and has since found its way into Nonconformist structures. It is now the common stock pattern which everybody knows by its crowd of side gables. There are instances of it this year in both the "Congregational Year Book" the "Wesleyan Report," and the "Baptist Handbook," and it has been repeated round London, till it bids fair to become a sort of architectural nightmare, hardly to be escaped from. No doubt a rather similar arrangement may be found in some German churches, by no means the best of their class. But there the bays are usually very wide, and the gables few, and only put where they are necessary. At Hereford, for instance, each gable is nearly 30 feet wide. In other words these recent exaggerations of the type have five gables where the originals have two. This is developing an idea to some purpose, only it happens to be in the wrong direction. The Germans had quite gables enough. They flavoured their pie pretty strongly; but the pie all quinces, the design all gablets, was left for English designers to produce. If endurable at all it was only just for once as a novelty; and yet if ever an idea was fairly worked to death, this one has been. It is satisfactory, however, to see that the architects who first brought it into notice have also been the first to abandon it. With very wide bays, and consequently very few gables, it might still be sometimes useful, but on the ordinary church of some six bays long, even the huge barn roof would be a more merciful infliction. There now remains only the system of three longitudinal roofs, one to each aisle. This is not very uncommon in ancient work, though more so in modern buildings of the sort now under review. Probably the inconvenience of its long gutters, so liable to be choked by snow or leaves, has operated against its employment. This fault might perhaps be lessened by a little ingenuity, and the triple roof system might then prove the best of the three. This, however, is not saying much Not one of these three systems, even in the best hands, ever produces a result comparable even to the ordinary clerestoried exterior. The churches in which they appear are usually the poorest of their class. All of them have, in addition to their other faults, a comparatively low and square outline; a special objection in town churches, which urgently demand a lofty exterior to keep them from being dwarfed and spoiled by surrounding houses. And of course none of them do anything to remove the internal failings of the three-column church. Whatever expedients may be tried, anything worth calling internal architecture is out of the question, while the main columns are so small as to be half invisible.

The nave and aisles plan, the conventional type from which few indeed of our churches ever venture to deviate, has thus been noticed in both its varieties. The result may be stated thus. When its columns are *thick*, or moderately thick, it inevitably shuts out a multitude of people from the service. Supposing it to be five or more bays in length, at least a sixth and sometimes a fourth of the congregation are placed out of sight both of the pulpit and of the communion table. It admits of excellent architecture, but it is inseparable from gross inconvenience. When, on the other hand, its columns are *thin*, the inconvenience is removed, but the architecture is ruined. The system has been forced into compliance with modern demands, but it has been killed in the process. The mediæval arrangement has been retained, but the only thing to be gained by retaining it—architectural excellence—has vanished. The type as it remains here is but a shadow of its former self; a mediæval church in the last stage of starvation. To architectural readers, some apology may be needed for the space which has been occupied in proving a fact so clear. And to some other readers, a similar apology may be due for that taken up in showing that ordinary nave columns cause an unreasonable amount of obstruction. Both these points seem sufficiently evident, but if they are so, why does not the natural result follow? If it be really understood that on the ordinary nave and aisles plan we are bound down either to bad arangement or to bad architecture, why is that plan still almost universal.* Perhaps here, as elsewhere, each party sees the weak points of the other much more clearly than its own. The class which adheres to the stone column variety says to the opposite one "Your architecture is bad; you have ornamented your buildings before you properly designed and constructed them;" and the other retorts "Your arrangement is bad; in your churches hundreds of people can neither see nor hear." And an unprejudiced lookers on finds it very hard to deny the truth of either statement.

What then is to be done: to build thick column churches unfitted for their purpose, or thin column ones unworthy of their destination? Neither: but to step out of this enchanted circle of habit and precedent in which we go round and round and get no further; to break through the "tyranny of custom," and to find a type on which architecture and practical utility are not incompatible. Such a type will never be supplied by the ordinary nave and aisles' plan, whether its nave piers are thick or thin. But it may be certainly attained in either of these two ways: by designing our churches without columns at all, or by designing them with substantial columns placed where they will cause no obstruction. The former system is already adopted in small buildings, and there are some signs, as in the new Wesleyan Chapel at Barking, of its future employment on a larger scale. It allows great variety of form. Its plans may be oblong, cruciform, circular, or polygonal; or still better, a fresh combination of these different elements. On the latter system the columns may be few in number and far apart, or they may be placed so near the side walls as to obscure not the seats, but only the passages leading to them. We may thus have either the wide nave and narrow side aisles, or the ordinary nave with very wide bays, or both together. We may plan a grand open space before the pulpit and communion table—surely a natural arrangement for a Protestant church—and we shall find ample scope for architecture in its external and internal treatment. It was for Catholic times to perfect the long, many-columned avenues of nave and aisles; it remains for us to develop the equally magnificent capabilities of the central dome and lantern tower. "Any one," says the late Rev. J. L. Petit, "who believes that our services were intended to be performed in the sight and hearing of the whole congregation, will admit that the great object of the church architect should be the attainment of a large unbroken area in front of the minister, in whatever part of the service he is engaged. Our adherence to the models least suitable to this purpose, and our rejection of those which are admirably adapted to it, is a strong proof that we are studying the Gothic in a spirit of servile imitation, instead of treating it as a style to be refined upon and improved." It is this "spirit of servile imitation" that has been the bar to progress. It is this that has thought it better to copy the Catholic church arrangement with starved iron columns, than to invent a new one with clustered shafts or good stone piers placed where they will cause no inconvenience. The thin iron column plan, however, will not last for ever; for people, as M. Viollet le Duc says, grow tired of everything in time, even of what is most contrary to good taste and reason. It will doubtless be gradually abandoned in all but the poorest buildings; but as it is so we have one earnest hope to express. It is that those who abandon it will at last give up copying the Mediæval church arrangement, the "conventional church type," and help in the work of evolving a church type fit for modern uses; that when they give up the nave and aisles plan with thin iron shafts, they will not straightway go back to the same plan with thick columns (whether of stone or iron), as if in the nature of things there were no other choice left; that when they emerge from bad architecture they will not plunge instantly into bad arrangement and inconvenience. There is a far higher possibility before them, that of producing works fitted in every detail to Protestant worship; places where everyone can hear and see, yet solid, permanent and beautiful in their construction; fresh, real, and noble in their architecture.

* The Congregational Year Book, 1870. Hodder and Stoughton.
The 15th Annual Report of the Wesleyan Chapel Committee, 1869.
The Baptist Handbook, 1870. Yates and Alexander.

* That is, of course, bad arrangement for the purposes of a Protestant congregation. It is not in the slightest degree meant to deny that much of the modern architecture designed for a Catholic, or semi-Catholic ritual fulfils its purpose, or that it deserves, from an artistic point of view, corresponding admiration.

SOCIETY FOR THE ENCOURAGEMENT OF ARTS, MANUFACTURES, AND COMMERCE.—ART WORKMANSHIP AT THE SOCIETY OF ARTS.

Why, in the name of reason and common sense, was such a design prescribed as that of No 1 in the first division—one of the most inane of Renaissance compositions, consisting of two floriated dolphins afflicted with water on the brain, twirling symmetrically under a gouty, nondescript vase, with a Cupid's head and pair of flabby wings balanced on its point? Vile, however, as was the model thus set before the copyists, and cruel the worse than waste of time entailed upon them, it would have been well if the original had been placed here beside the work of its imitators, that it might be seen if there were any executive merit in it which they

have missed; for merit of no kind can we discern in any of the works of the four competitors in this instance. Unaccountable though they may be for the rapid and tortured curves, there may have been some delicacy of drawing of the acanthus leafage of the model, but there is none whatever in these sandpapered abortions. Out of the four ugly and misshapen cherubs' heads we are somewhat curious to know if one among them bears any resemblance to that on the panel in the South Kensington Museum: certainly not more than one could do so, for no two of the copies have anything in common but equality of badness.

Better in many respects is 5A, Class 1 (*f*). Part of a frame in possession of Henry Vaughan, Esq., by Mr. Thomas Wills. The foliage is crisper, and the tool marks have not been sandpapered out. The design is rich, playful, and picturesque; its scale being small, it is comparatively very elaborate. It is in the figures of the Cupids and mermaids, only that the carver appears to have got out of his depth. No. 5, by Mr. C. H. Line, after an entablature of a chimneypiece in the South Kensington Museum, consisting of two satyrs playing in the centre, and wreaths of vine on either side, we should advise to be left "unfinished," for it is hopelessly wrong. In this case we have a photograph of the original hung under it, whence it is evident that Mr. Line had no excuse for making the thickness of the arms of the figures three times that of the legs, or of equally murdering the foliage. If he spent all the time devoted to this ambitious work in properly carving one spray, he might have caught somewhat of its spirit, which, as it is, he has entirely failed in doing.

Turning to the Repoussé work, Class 2 (*a*) in a glass case upon the table, we find better work. Nos. 6 and 7 by A. Dufour, executed in iron after the examples in the South Kensington Museum, are exquisitely modelled and chased. "The Virgin and Child," an iron panel in low relief, being the subject of the latter of these and of Nos. 8 and 9, by Adolph Ostertag and W. Holliday, respectively, we carefully compared them. In doing so we again sadly missed the original to assist us in deciding which is the best copy. We can safely commend all as works of art, but No. 8 appears to us the most delicate and refined, and the modelling the most delicate; notice the dimples in the elbow of the child and the drapery round its waist and the leg and foot. In No. 7 the drapery is coarser, and the flesh looks as if its modelling had been scrubbed out. No. 9 is still coarser, the head of the child commoner, and the profile of the Virgin's head is puddingy, but some details of the embroidery on the Virgin's dress appears somewhat too faintly rendered in No. 8, to whose author, however (Mr. Ostertag), we should award the prize. Of No. 6, however, the other example by Mr. Dufour, we can speak very highly after having carefully examined it, together with a photograph of the original—the *martello* bronze mirror case in the South Kensington Museum. No. 10, the last work in this class, a repoussé work in silver, after a tazza in the Museum, by A. Clark, also deserves much praise. The acanthus border is well modelled and full of spirit, but the figures of two river gods and two females in the centre will not bear close examination. Note the clumsy arm of the one of the latter with the wings. The hammered iron knocker set as the next copy, was not a sufficiently pure and good specimen for the purpose. We trust that greater care will be exercised in this respect by the Society in future, for it is sad to think of students being condemned to copy indifferent works, and to have the keenness of their perceptions of the beautiful blunted, instead of sharpened, by the works upon which they are called upon to labour so long. The difficulty of coming to a right and fair judgment also is increased, for when the copy is bad, especially in wrought-metal work the most spirited and therefore the best workman, is likely to prove the least faithful. Again, there should be some rule as to identity with regard to the scale to be preserved. Here No. 13 is only half the size of Nos. 11 and 12, and affects a delicacy absent in the others. Without the original how are we to judge of the accuracy of the copy in the several cases? For our own part, we should say this coarse design needed a bold treatment. Of the two larger specimens we should unhesitatingly give the prize to No. 11, by "A. S.," but in judging between his work and that of No. 13, by Thomas Bayley, we should need further information on the points above named. The only carving in ivory, Class 4 (*a*), is No. 14, a Plaque, after one of Silenus and Amorini by Fiamingo, by H. Godart, having a photograph of the original hung alongside of it, appears to be very faithfully and well executed. Being without a competitor, we should not hesitate to award to its author whatever prize was offered for this class. As we unfortunately failed to find No. 15 in Class 5 (*b*), a chasing in bronze, we can neither speak as to its merits or demerits.

In Class 6, Nos. 16, 17, 18, 19, and 20, are examples of etching and engraving on metal after an Arabesque by Lucas Van Leyden in the South Kensington Museum, an admirable work, but one which we do not think a good model to copy. The copies are careful, No. 18 being least so, and Nos. 17 and 20, by Mr. James G. Gill, and Mr. John Gittens, the most. Of paintings on porcelain, after a drawing by Raphael in the South Kensington Museum, there are several specimens, Nos. 21 to 26 inclusively. The competitors have found difficulties in translating a sketch into careful drawings, particularly in foreshortened limbs, and we doubt whether one has referred to Nature for assistance; and some have, Chinese tailor like, in copying illegible scratches of the pen, transformed them into positively defective drawing, notably in Nos. 21 and 22. We prefer No. 26, rendered in colour by J. B. Evans, and No. 25 in monochrome by Miss E. Henwood. Nos. 27, 28, and 29 are also paintings on porcelain, after a conventional Renaissance ornamental panel by Aldegreve; the two former executed in blue, and the last in monochrome on gold grounds. No. 27, that by J. B. Evans is drawn with the greatest freedom. Nos. 30, 31, and 32 are attempts to render the same design upon a larger scale as decorative paintings. Here, there being more scope, it has been at greater risk, and all are more or less failures, but the two which ambitiously have aimed at colour may be pronounced the greatest. We think great blame is due here also to the proposers of the model.

In Class 11, Cameo cutting, but one example is shown. Head, after bust of Clytie, in the British Museum; no name but address only given. There seems merit in the head but little in the shoulders.

In Class 12, Die Sinking, there is but one: a creditable production by A Walker, after a Wedgwood medallion.

In Class 16, Bookbinding, No. 35, Mosaic pattern, by Louis Genth, is a good design, well executed; so also is No. 36 in Class 17, Embroidery, a work executed after an Italian Altar Frontal in the Museum, by the Misses Pfander, who may be congratulated upon having been allowed to spend their time and labour upon a comparatively beautiful object. Mr. Charles Pfander also sends two well-painted illuminations, No. 37 and 38, in Class 18, the one of Christ in the Garden of Olives, with ornamental border by Giulio Clovio, and the other a bold and richly coloured specimen in the possession of the Museum, representing the birth of Christ.

These close the list of the works sent in according to the conditions of the First Division, namely, Works executed after Prescribed Designs. There are two other divisions of which we have not space to treat upon the present occasion, but to which we hope to refer again.

SOCIETY OF ARTS.—ART WORKMANSHIP COMPETITION.

[ANOTHER NOTICE.]

IN March, 1863, the Society of Arts, in view of the defects of English workmen when compared with the skill of foreigners, determined on an annual competition among artisans to improve their executive skill, hoping by the award of prizes to encourage and develop those branches of art workmanship which are most applicable to manufactures. They began by calling for works to be executed from prescribed examples of good ornament or art, which the workman was invited to carve in wood or marble, or engrave upon metal, according to his trade. A committee appointed by the Society determined upon and arranged the subjects (always the designs of artists of reputation), and photographs or casts from the original were sold at cost price to the artisans, who were then to translate them into their various modes of workmanship. After some time the workmen complained that they were too much tied and hampered by this rule, and that they would prefer to be allowed the exercise of their own taste in the selection of subjects for their skill. To meet this desire, in 1868, the Society determined to add to their former subjects—prizes for skilled workmanship in processes hitherto but little followed in this country; thus the art of enamelling on metals, though known and practised in England in mediæval times, gradually became entirely unknown and unpractised by English workmen, while in France it had been revived, and it is now largely used in decorative furniture of various kinds. Glass, again, has hitherto been blown in the same forms, and the same processes of manufacture have been copied, as those used by our immemorial ancestors, and no attempts have been made to follow the beautiful specimens of "fillegrani" or millefiore work which had not entirely died out in Venetian localities, and has been revived lately with such excellent effect by Dr. Salviati. Other processes, neglected or in abeyance, were added, and the subjects to be wrought in them left to the choice of the workmen, who were allowed to associate themselves with their employers, or, rather, the employer was allowed to be associated, in some cases, with the workmen producers. At the same time, there was a third division in the Society's programme, consisting of those articles executed by workmen freely, and of themselves, which do not come under the heads of either the first or second divisions.

In the first division there is not much advance upon last year's competition, but in the second we hail with pleasure several clever attempts in new processes. The specimens in the third division are the least satisfactory of all, because the workmen succeed in producing much better work when they have a copy to carry out than when they have to rely entirely upon their own taste. Let us take as an instance the paintings on porcelain. Those done from the Raphael drawing (the prescribed design) are on the whole creditable performances, but if we turn from these to the porcelain painting coming under the third division, whatever skill the workmen may have had is lost from their utter want of knowledge of art, of the principles of light and shade and perspective—in fact of the making up a picture; we must, however, except No. 134, tray, "David the Psalmist," by John Eyre, which is a good bit of colour, and a clever composition. If it be his own, we suspect this exhibitor is rather an artist than an art-workman.

The first class of the first division—carving in wood, is not quite so good as in former years; there is an absence of figure carvings. In the carving of a chimneypiece, No. 5, by C. H. Line, there is much effort after delicacy of execution, but the venation of the leaves has been too much insisted upon, and there is a want of largeness of manner which can be seen even in the photograph of the original. In Class II.—repoussé work in any metal—No. 8, by A. Ostertag, executed on an iron panel, is a very skilful and painstaking copy, and on the whole adheres more to the marble example in the South Kensington Museum, than No. 7, by A. Dufour, which has, however, a freer and less timid execution, if more coldly imitative.

In the next class coming under our notice—hammered work in metals—we have only three works from the same design—an iron door-knocker; they are on the whole well done, and in looking at them we must remember that all the works are forged and chiselled. In Class IV. the ivory carving, by H. Godart, copied from a plaque by Fiamingo is coarse in execution, but perhaps it is wrong to judge it in its present unfinished state.

There is one work in the class set apart for chasing in bronze of which it is almost impossible to speak too highly. It is a missal cover, beautifully copied with true art feeling by H. J. Hatfield; the work is a perfect example of delicate tooling. One or two of the works in etching and engraving on metal are also good; one, No. 19, by W. J. Dyer, decidedly clever. Notwithstanding Mr. Godwin's remarks at the prize distribution of the Female School of Art, it would appear that even the large rewards offered by this Society for cameo cutting produce very little response; there is but one exhibitor. Class XVII.—Embroidery—is represented by a single performance, the joint work of the Miss Pfänders, for the Society of Arts not only gallantly declares the prizes equally open to male and female competitors, but in some cases offer special rewards to the weaker sex. The Miss Pfänders have done their work well; it is unfortunate that their model has not been a very harmonious one in colour, for the execution of the subject given is well rendered. In these days of Ritualism and vestments, surely there must be a great demand for this kind of work, which might be executed by women here, rather, than is often the case, supplied from Belgium. Let us now pass to the second division of our subject, and examine those specimens in which the taste of the worker is free, and only the art process and the uses of the object prescribed. Mr. Alfred Gray has produced an original work in his frame, engraved and champlevé enamelled on metal. The French are very successful in this kind of enamelling, but this is the first really good English work in this material we have seen. The designs for the book covers are interesting; many of them are done by C. Pfänder. The one with the ornament painted on a black ground is the best. It is refreshing to see English workmen trying to make filigree glass; and though E. Leicester's three champagne glasses are thick and somewhat heavy, and cannot yet compete with those by modern Venetians, we hail his attempt with pleasure, and look for progress. The fire irons, by E. Milward, are worse than poor; but both the designs for a balcony are good; No. 60, by W. and H. Robson, deserves particular praise. Observe that all the ornament is welded together, and not rivetted, as in the other balcony; itself, however, a very excellent work. Our space will only allow us to mention one or two works in the third division. G. Deere sends a very clever mask, a repoussé in copper from one of the Laocoon group; and G. Millward exhibits a skilfully-wrought circular ornament pierced in metal; his other work is excellently executed, but the design is in bad taste. The only good medallion portrait is by A. Heness, of Archbishop Manning, but several of the marble carvings are very creditable. The design for an embroidered table cover by W. Percivall is very weak. This arises from the naturalistic instead of the ornamental treatment of the flowers of the design, tending thus to meagreness and poverty of form rather than to that richness which would have arisen from a more ornamental rendering.

In conclusion, we must regret the small number of exhibitors in this most useful competition. Surely more workmen might avail themselves of the great advantages so generously offered by the Society of Arts, and, by adding to their value as skilful workmen, raise the standard of art manufactures throughout the country.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

AT the usual fortnightly meeting on Monday evening last, Mr. Joseph Clarke, Vice-President, in the chair,

It was announced that Mr. Ernest C. Lee had been appointed to the Pugin Travelling Studentship for this year. The drawings of Messrs. W S. Champion, Penstone, and W. Henman were strongly recommended.

Mr. Frederick P. Walters, of 11, Bond-court, E.C., was unanimously elected a Fellow.

Mr. ELIJAH HOOLE (Associate), then read

A SUMMARY OF MR. RUSKIN'S ARCHITECTURAL CRITICISM.

Mr. HOOLE prefaced his "Summary" by remarking that as Mr. Ruskin's architectural theories have been given to the world for twenty years, and have, during that time, been constantly discussed and reviewed, no great amount of novelty attaches to the subject. It seems certain, however, that until architects are agreed as to the principles of their art, no concerted action or real progress can be counted on. Mr. Ruskin has delivered a canon of criticism which not only aims at the settlement of those principles, but which is intended to enable every reader to distinguish good architecture from bad, and to constrain not merely architects, but all classes of the community, to cultivate the one and to extinguish the other. Now, if this could be done—if the principles of architecture could be clearly laid down, and thus extensively diffused, a great stride would unquestionably have been taken towards raising architecture to its proper position, and towards establishing and maintaining a just and intelligent criticism of all architectural works, both past and present. But Mr. Ruskin has, to a great extent, succeeded in making his readers critics. His own enthusiasm, his mastery of language, and his elegant and poetic style, take a strong hold upon almost all readers, independently of their possessing any previous feeling for art; and these, together with his sympathy with all earnest and genuine work, and his delicate perception of the beautiful, have enabled him, by his writings, to do more to make architecture popular than perhaps any one author has ever done. Architects, as a profession, are greatly indebted to Mr. Ruskin for calling the attention of all the reading world to the subject, and for insisting so strongly as he has done upon its dignity and importance. And this must be the case, to a very great extent, even to those in the profession who do not feel disposed to endorse his theories. But, as a large number of persons form their opinions upon architecture, either partially or wholly, according to these laws of criticism, an architect is likely to be frequently confronted with them in the course of his practice, and should either be prepared to adopt them or to give valid reasons for rejecting them. The subject, therefore, has a practical as well as a speculative aspect. Mr. Ruskin's success in popularising architectural knowledge makes one indulge a hope that one day the principles of architectural art will be put into definite and authoritative form by architects themselves, and that they will be universally understood, not only by those occupied in reducing them to practice, but by every educated person.

As the time allotted to the reading of a paper at the Institute is too limited to allow of even a passing glance at the whole of Mr. Ruskin's published opinions upon architecture, those contained in "Modern Painters" and in "The Seven Lamps of Architecture" were alone referred to by Mr. Hoole. These were very ably summarised; but as Mr. Hoole made little or no comment of his own on Mr. Ruskin's ideas, we need not encumber our columns with matter with which most of our readers are doubtless familiar, and with which those who are not acquainted can better become so by a perusal of Mr. Ruskin's works themselves. In concluding his very able and exhaustive summary (so far as it went), Mr. Hoole said that, without expressing entire concurrence with all that Mr. Ruskin had advanced, he would acknowledge the debt under which every architect must feel he had laid the profession by placing architecture in its true position of honour and importance, and by his brilliant and conscientious endeavours to enunciate his principles.

DISCUSSION.

PROFESSOR KERR, in proposing a vote of thanks to Mr. Hoole for his paper, said that it was not always convenient to discuss or to propose for discussion in a society such as the Institute the opinions of such a writer as Mr. Ruskin. No member of the Institute could venture to consider such a subject without considerable misgivings, and, in point of fact, the meeting could not be called upon for its opinion, direct or indirect, upon the theories laid before it. At the same time, they might trust themselves to consider, if not to debate, the condition of things as represented by Mr. Hoole's paper. It seemed to him (the Professor) that the lecturer had done well in advancing no criticism of his own, and that he had also done well simply to condense the essence of what he conceived to be Mr. Ruskin's views. One could easily gather from the tone of the lecturer himself that he did not expect practising architects to agree in all or even in many respects with the views which had been stated, and he certainly could not, as a practical architect, suppose that the profession failed to perceive the very limited extent to which those principles applied to the practical work of the architect. The subject of architecture, it seemed to him (the Professor), was one which had been over-ridden by theorists in various ways during the last fifty years, and the precise position now assumed by Mr. Ruskin—that of the last and most successful theorist of the day in respect of architecture—was a position arrived at by a direct and intelligible course which could be easily developed. Some of the members would remember, and all of them would know, that some fifty years ago the *dilletantism* of the Classic antiquarian was supreme in architectural criticism. Everything was referred to certain principles, which were very intelligently, but somewhat stringently, derived from the study of the works of the ancient Greeks and Romans, and copyism in its most decided form was then universally recognised. But it was not to be supposed that that principle should remain in absolute authority for any great length of time without a material change, and accordingly, even at that time, it was found that a certain romanticism was coming into architectural criticism—springing from the contemplation, not of Classic works, but of Mediæval works. In course of time, but very slowly—for it had taken nearly a century to develop the modern Gothic revival—this new kind of copyism gained ground. Then another description of romanticism altogether came into force in respect of what is now called ecclesiology, which became a potent influence and profound science, so to speak, in the hands of its admirers and students. Many architects conscientiously deplored the extent to which ecclesiology had governed architectural practice within the last twenty or thirty years. Then the picturesque came to be diligently studied and specially introduced into architectural criticism; and many writers, many thinkers, and many designers were found to dwell upon the element of the picturesque strongly and earnestly, as containing an essence without which architecture was of no value. Then the last step in this career of progress was the introduction of the poetic element, and here, at last, we came to Mr. Ruskin, for Mr. Ruskin was neither more nor less than this: the high priest of a faith which identified architecture with poetry, for the first time in artistic history. Such being Mr. Ruskin's position, what had he, up to the present moment, made of it? The lecturer had laid before the meeting concisely, and only from Mr. Ruskin's earliest works, a certain scheme of—one could not say architectural æsthetics, one could not say architectural practice, but—architectural dreaming, attaining at last to—what? Simply to the production of a certain sensation, of the kind of having listened to something eminently suggestive, eminently thoughtful, very often powerfully expressed, but, architecturally, useless. For if architects were to be called upon to accept Mr. Ruskin's definition that architecture was "uselessness," they might, at all events, retaliate by saying that Mr. Ruskin's mode of putting his ideas was to them useless in every possible way. Not that he (the Professor) would detract from Mr. Ruskin's eminence in his particular field. He was rather inclined to suppose that those architects who assigned to Mr. Ruskin so high a position in architectural criticism and in the advancement of architectural knowledge as the lecturer had done, were doing with Mr. Ruskin as Mr. Ruskin did with Turner, who acknowledged that he was unconscious of the merits which Mr. Ruskin assigned to him, and therefore he (the Professor) would prefer to think that Mr. Ruskin was less ambitious than his admirers would esteem him to be. But he thought that every member of the Institute would be most willing to assign to Mr. Ruskin a very high place as an amuser of the public, and they would also be ready to ascribe to him a very high place as a describer of his own somewhat abstruse and recondite thoughts. But when Mr. Ruskin assumed to bring word painting to bear upon what in practice were found to be very common place subjects, they might perceive the reason why it was that Mr. Ruskin delighted the uninformed public, while he utterly failed to instruct the initiated architect. He (the Professor) would not turn upon such a writer as Mr. Ruskin, and tell him to take pencil in hand, and show what he meant. He would cheerfully allow him to say all he had to say, and believe his intention to be to keep within certain speculative limits; but he thought that architects should carefully guard against it being understood that they, as a body, were the admirers of Mr. Ruskin that they were supposed to be. They gave him all the praise possible for his eloquence, thought-

fulness, integrity, and manliness of purpose, and critical ability, but let it not be said that Mr. Ruskin was recognised by architects as an architectural teacher. Mr. Ruskin was a member of the Institute, and that showed the respect entertained for him; they did not discourage his efforts: they honoured them. But the philosophy which Mr. Ruskin developed in his studies of criticism—for this, the Professor thought, was something like the expression that he ought to apply to his writings—was not an æsthetical philosophy, though there was a great deal in it which bore upon its face the appearance oe æsthetics. When Mr. Ruskin said there could bf no good architecture without good building, he made a general statement which might be suggestive within a narrow circle; but architects, who knew what building is—whereas Mr. Ruskin did not—could see nothing but the merest commonplace in any such statement. Mr. Ruskin's writings were not æsthetical—they were poetical, and every expression which the lecturer had quoted was excellent if looked upon as poetry—and poetry, brought to bear on such a matter of fact as architectural design, might often be beneficial in its influence; although it is the suggestion of that which is by the statement of that which is not. But Mr. Ruskin could never be expected—and it was in vain for his admirers to expect it of him—to condescend to plain, intelligible statements involving plain architectural principles. If Mr. Ruskin were looked at in this particular view, much more honour would be done him than by accepting fully all that he might say as a public teacher, and he would be assigned his proper place in the economy of the architectural world. He hoped that Mr. Ruskin would yet do great service to art. The Institute had congratulated him cordially upon his recent appointment to an important professorship of art, and it was to be hoped that during the term for which he holds that appointment he would give to the world some new and improved principles, and he (the Professor) hoped that Mr. Ruskin would say less of architecture, and more of the other arts. There was a great field open to such a writer, thinker, and word-painter in other arts. He did not think Mr. Ruskin had written much on architecture latterly; he had indeed spoken in disparagement of his own published views, and he might be said to be very near coming to correct principles when he perceived that he had written much in error. If he devoted the great powers with which he had been endowed by Nature to the development of those arts which are much more poetic in their nature than architecture, he would be doing more service than by devoting them to an art the poetry of which must necessarily be confined within narrow limits.

Mr. Seddon, in seconding the vote of thanks, differed considerably with the opinions enunciated by the learned Professor. He said that he could speak for himself and for many others when he stated that architects had been influenced in their practice by Mr. Ruskin, and though there were many things in those writings that now sounded as mere truisms, it should be remembered that they were not considered as truisms at the time they were first published. He thought that in calling the attention of the public and of the profession to the simple maxim that architecture, like all other things, should be founded on honesty and truth, Mr. Ruskin did great service. His chapter on "Life in Architecture" laid down many important principles, some of which were hardly recognised thoroughly yet. On the whole, he was inclined to think that Mr. Ruskin was to be looked upon as a great teacher of principles in architecture as well as in other arts, and that the profession, as well as the public, was deeply indebted to him.

Mr. Brewer said that it appeared to him that the great charm of Mr. Ruskin's works was that they introduced the reader to a new field of architecture. Until those works were published, many of the beautiful Mediæval works of Italy were very little known, and less understood. The extended use of marble and coloured materials in modern architecture was, Mr. Brewer thought, mainly attributable to Mr. Ruskin's writings.

Mr. Nash said that Mr. Ruskin had undoubtedly been of some value to architecture, but it was questionable what that value was. He had associated poetry with architecture, but architects had not learnt from his writings a very great deal in the shape of principles to guide them in the practice of their art, though they had learnt a great deal of good feeling from them. From none of Mr. Ruskin's works could any great canons be laid down but what had been acknowledged centuries previously. Where was the poetry of Mediæval buildings? Did it not exist at the present moment? Do not the symmetry and proportion advised by Mr. Ruskin exist there? Was it against modern art that he was raging? Going back beyond the architecture of the Georgian era—which Mr. Nash admitted was extremely debased—we found Sir Christopher Wren, who he (the speaker) maintained was the great reviver of Gothic art. Wren practised in England at a time when art was at a very low ebb—when Mediæval art had wholly gone out, and was hardly recognised as art at all. But Wren, with his great skill, and his great powers of observation, in travelling through the country noticed with an artist's eye the things which he had never been taught, and which nothing but his eye did teach him, for he never studied Gothic art; but he attempted it, and in a measure succeeded, and while his restoration of the Abbey towers at Westminster was to be condemned, there were other works by him—for instance, the tower of S. Michael's, Cornhill—which showed that he could appreciate Gothic art. He (Mr. Nash) merely referred to Wren to show that Mr. Ruskin was not new in what he was doing. By throwing a halo of poetry around art he had conferred a great benefit, but everything that he said was very impracticable in its nature. He told architects to lay down rules and canons, and talked of proportion and truth; but where were *his* canons? Everyone, perhaps, could understand a canon of truth, but it was not everyone who could understand a canon of proportion. What was proportion? He (the speaker) doubted whether any one then present could define it. (Mr. Kerr: The rule of three.) No; it was not the rule of three, nor the rule of two, but that it was a rule of difference everybody knew; for if there was no difference in sizes there was no proportion. Two and two were not proportionate—they were both alike. There was no proportion in a form like a circle or a square. For proportion to exist there must be gradation and opposition of size.

The thanks of the meeting having been tendered to Mr. Hoole for his paper,

The Chairman announced that the Council had selected Mr. Benjamin Ferrey, Fellow, F.S.A., as this year's nominee for the Royal Gold Medal.

Mr. Paschen, the agent in England for the terra-cotta manufactured by Ernst March Söhne, of Charlottenburg, near Berlin, next described the characteristics of that material, which while being equal (according to Mr. Paschen) to the ware of our English manufacturers in respect of quality, was able to compete successfully with it on the score of price, owing to low rates of carriage and the cheapness of foreign labour. This terra-cotta was being used in the new Manchester Exchange.

The meeting then adjourned.

THE R.I.B.A. AND MANSION HOUSE DINNERS.

The Court of Common Council is not generally renowned for displays of wit, and therefore the attempts at pleasantry made there last week, though not remarkable in themselves, are noteworthy by reason of their authors. There is a "little spot" of vacant ground opposite the western side of the palace of the civic monarch, said to be worth £180,000. The ward of Walbrook, foolishly insensible to the pounds shillings and pence view of the question, and probably led astray by some insane enthusiast of artistic predilections, ventured on Thursday week to petition the Council for the preservation of the said vacant space. A similar wish had been previously expressed by the Council of the Institute, who should feel thankful for the opportunity afforded to its members of receiving instruction in their profession from three distinguished City councillors—Messrs. Deputies H. Lowman Taylor and Henry De Jersey, and Alderman Sir Benjamin S. Phillips. Mr. De Jersey and Sir Benjamin Phillips, contented themselves with offering advice. We learn from them that nothing does less to relieve traffic than to widen a street, that Mr. Peabody's statue (which it was suggested might be placed in the open space to be reserved), is an eyesore, and the open space in question will be rendered much more beautiful by being built upon, than by being left vacant, as proposed. Mr. Lowman Taylor was, however, more than equal to the occasion. It remained for him duly to rebuke the impertinent interference of the Institute, and to do so with a spice of wit savouring strongly of that part of the Mansion House where he and his *confreres* especially shine. As to the Institute of Architects, though he gave them credit for sincerity, he believed one of their principal thoughts had been that, if the space were retained, it would be a first-rate place to draw up their carriages in the event of a dinner at the Mansion House. Comment is needless. The shameful audacity of the Institute in presuming ever to expect to dine at the Mansion House, and on that expectation to attempt, by a ruse, to provide a standing place for their carriages at the expense of their hosts has, we trust, received its *quietus*. We did mean to improve the occasion by pointing out to the members of the R.I.B.A., how their carriages managed to "draw up" on former occasions, but on diligent search we cannot discover any previous record of such an event as a dinner given at the Mansion House to that insignificant body.

ON ORNAMENTAL IRON WORK.

Second Lecture.

Mr. J. M. Capes, of Balliol College, Oxford, delivered his second lecture on this subject at the Kensington Museum on Monday evening last. The attendance, as on the former occasion, was large, and mainly composed of working men.

Mr. Capes commenced by giving a brief résumé of his last lecture, and proceeded to say that special peculiarities in any material ought never to be lost sight of. The special peculiarity of iron in relation to all other materials was its tenacity or toughness. This toughness was the result of a certain condition of the acids which composed it. Of all metals, wrought-iron was pre-eminently the most tenacious. It varied from other metals in several important points. Though it could not be beaten it could be forged at a heat far below that at which it melted. In this respect it resembled platinum. In its power of conducting heat and electricity, iron differed much from other metals. Wrought copper came nearest to iron in point of tenacity, but iron was often more than twice as tough as this, five times as tough as zinc, and eight times as tough as tin, for all practical purposes. Again, as compared in weight with stone and marble, iron was much heavier, and this excessive weight rendered it necessary that the ornament and framework should be far lighter than that of other materials. Ornamental effect could be accomplished with iron in the hands of the skilled workman of cultivated taste which was quite out of the question with other materials Iron was to a great extent like the human body, held together by grasping or clasping, and not by mere weight. The great secret of employing iron successfully was to bring out its toughness in every possible way. It was this toughness which enabled engineers to construct those massive arches to be seen at railway stations and at large factories, without upright divisions breaking the space. The lecturer then proceeded to observe that not merely should the workman invent his design and make it suitable to the peculiarities of his material, but it should be his object to ascertain that he was not throwing his labour away upon a worthless sample of iron. He should be particularly careful in working with this metal to ascertain that it had not been rendered brittle by vitreous oxide or glassy rust, or by phosphorus and sulphur, which were fatal to its durability. The workman would find that the purity of his iron was most essential when he came to the welding together of the different portions of his work. At present there still existed a good deal of uncertainty in the quality and purity of iron. On this point Mr. Nasmyth, whose opinion was of great weight on such matters, stated that the faulty welding which was sometimes observed in iron work was frequently caused by the chemical qualities of the iron, quite as much as by the bad workmanship of the artisan. Mr. Capes then proceeded to note a grand distinction in iron when compared with wood, stone, marble and many other materials, which was in the capacity of having its different portions all wrought into one during the process of welding. It was only in metals, and especially in iron, that this absolute union could be produced. Perfect welding was the ironworker's especial privilege, and it was one in which he should never be found wanting. Another rule to be observed was that a work of art in one

material ought never to appear to be made of any other. Ironwork should not only be substantial and durable, but should appear to be so, and should show that who executed it understood the capabilities of the material on which they were employed, and that they were not merely the slavish imitators of things about which they knew nothing. At this stage Mr. Capes directed attention to several specimens of ornamental ironwork which had been selected from the Museum collection as illustrations of the lecture. They were principally window-gratings of the fifteenth, sixteenth, and seventeenth centuries. Passing from them, he went on to say that ere the British workman rose to the position of an artist (such as he was some 500 years ago, such as some workmen were now, and such as all the world were declaring that the artisan should be) it was necessary that he should throw his heart into his work, for no artisan could throw his heart into a work which he believed in his own mind to be faulty. He must be satisfied as to the soundness of his design, of its accuracy in detail, and its perfection in execution. He should have reasons for what he had done. On such a debated question as that of the adaptation of natural forms to the purposes of art, he would not now enter, but would remind his hearers that nature was the only guide, and that to depart from it would be to produce what was odious. Mr. Capes next alluded to our street architecture, and contrasted the streets of London with the streets and boulevards of Paris, much to the disparagement of the former. He pointed out that one great feature of the Paris thoroughfares was the extensive use made of iron balustrades and balconies in front of what we called the flats of houses. One reason of the poorness of our street architecture was owing to the practice of making the upper stories of our houses lighter, thinner, and less lofty as they reached the top. In fact, our street architects seemed to go on the principle of the higher you go, the poorer should be the accommodation, and the poorer the outside effect. The Gothic plan was very different from this. It went upon the principle of making each story as nearly as possible of the same height as those above and those below it. If anything, the higher the stories, the loftier they were. He looked forward to the time when the use of ornamental ironwork would become an important element in the exterior adornment of our houses. In concluding his lecture, Mr. Capes dwelt long and earnestly upon the importance of bringing the workman into closer contact with the purchaser than he at present was, and observed that something in the form of a club was needed, founded, perhaps, on the principle of the Royal Academy and one or two other institutions, which brought the artist face to face with his patrons. A striking instance of a club of this kind was that established at Mayence, on the Rhine, where plans had been arranged whereby workmen in upholstery and cabinet work could send their productions for exhibition and sale, provided such productions possessed real merit. In connection with this club was a people's bank, from which money was advanced on loan on easy terms to the deserving, for the purchase of materials wherewith to work. This institution had been successful in a commercial point of view, and in the main object for which it was established—viz., the bringing of the art workman into direct intercourse with his customer. Some such arrangement was needed in England. There were not many obstacles (the lecturer observed), to the raising of the art workman in the social scale but what could be surmounted. Only let him study the principle on which all ornamental work ought to be designed, and he must raise himself. A distinguished critic had lately expressed an opinion that the English artisan would never attain to any great excellence in ornamental art, either because he had not the root of the matter in him, or because circumstances in a measure prevented the development of his natural capacities. He (Mr. Capes) differed from that opinion. The Englis had succeeded as painters, as sculptors, and as architects, and there was no valid reason why, after careful and correct study, they should not succeed as art workmen. Nor was there any valid reason why they should not be as skilful and successful as were the English artisans of four or five hundred years ago.

In the third lecture (to be delivered on Monday next) Mr. Capes will enter upon the question of the propriety or otherwise of copying the exact forms of natural objects, such as leaves, flowers, &c., in works of art metalwork.

NOTES ON SOME OF THE TIMBER BUILDINGS IN ENGLAND DURING THE MIDDLE AGES.*

By Charles Baily.

OWING to the continual alterations to the ground floors of the houses in towns, to adapt them for modern use, the shops have nearly all been destroyed, and it is very seldom we find one in so genuine a condition as that at Lingfield.

Crowhurst Place was late in the last century much modernised and injured by removing some of the timbering of the sides of the lower story, and by building up walls of brick in place thereof; but there remains evidence to prove that the house in some parts had the oversailing or jetty floors, particularly to the front wing over the large room at the upper end of the hall, where there still remains in the interior of the room the old oak ground sill, measuring 11in. wide and 8in. high, just within the modern front wall. This sill is mortised to receive a double row of upright studs, a somewhat unusual arrangement; but which was no doubt so done, not only for additional strength, but to form a hollow space in the outer wall for the purpose of keeping the room perfectly free from damp, although this mode of construction does not appear in any other part of the house. It is very likely that at the same time the destruction of the original window-frames of the hall took place, as well as the covering of the outside of the upper stories with the present weather tiling.

The situations of the original windows of the hall can be with tolerable certainty made out. They appear to have ranged along the whole length of the upper parts of the sides, between the main posts of the framed walls, and probably were divided into many lights in width by mullions, and into two lights in height by a transom. One such original window, six lights wide and two lights high, still remains in the end wall of the house, at the top of the stairs from the entry.

There is no evidence to show that the hall at Crowhurst ever had a projecting bay window—very probably it had not. But this sort of window was a very usual although not a universal feature. Some large halls had two, as at Hampton Court, and at Christ Church, Oxford; and at Eltham, in Kent. And these windows were generally situated at the upper end of the room, one on each side of the dais, and the sills were sufficiently near to the floor to enable any person in the room to get a view of the outside.

Except as to the bay windows, the cells were generally placed at a high level, and the great hall of Croydon Palace has a range of windows on each side, the sills of which are as much as 17ft. above the floor of the hall; but the uppermost bay of the room has also other windows at a lower level, the sills being only 3ft. and 3in. from the floor of the dais. Such "low windows" in this situation appear to have been very usual.

Geoffrey Chaucer, in the "Miller's Tale," says:—

> So mote I thryve, I schul at cockes crowe
> Ful pryvely go knoke at his windowe,
> That stant ful lowe upon his boures wal.

And again:

> He cometh to the carpenters hous,
> And stille he stant under the schot windowe,
> Unto his brest raught, it was so lowe.

Notwithstanding the many alterations and partial destructions which the house of Crowhurst Place has undergone at different times, yet some of the apartments contain much of the original work, and afford us many very valuable examples of the carpentry of the fifteenth century. The roof of the old hall is perfect, with the sole exception of the destruction of the louvre. The timber, a very large quantity of which is used in the construction, is in a very sound state; the amount of manual labour bestowed upon its finish is immense; and, perhaps, for its size and date, it is as good an example as we have now remaining. It has three heavily-framed principals, one at each end, and the third crossing from side to side in about the centre of the hall, thus dividing the room into two bays, but of somewhat unequal widths. These principals are constructed with tie-beams, as is mostly the case in buildings with timber sides, beneath which are large curved braces forming four-centered arches across the hall, and which are very firmly framed into the tie-beams, and into the stout upright supporting story-posts of the sides, and well secured with wooden pins. The most usual mode with the carpenters of the middle ages of fastening together of timbers was by mortise and tenon, and wooden pins. Iron bolts and straps were introduced at a comparatively late period, and it is very doubtful if the older system is not the better in many respects. Where the old joinings have given way, we seldom see that the wooden pins have been broken; the mischief has more often happened from the end of the tenon between the pin-hole and the end of the timber splitting out. When iron bolts and straps are used in connection with oak timber, the sap in the oak is very apt to occasion a corrosion on the surface of the iron. This causes a decay of the wood, and the bolts become loose; and thus, in all those cases where there is not sufficient strain to break the tenons, the ancient mode of joining the timbers appears to be the better of the two plans, particularly in outside works, where the space occasioned by the slight decay of the iron and the wood lets in the wet. Upon each of the tie-beams stands a large timber arch, which again supports a collar-beam, and which, with the principal rafters, completes the truss of each principal.

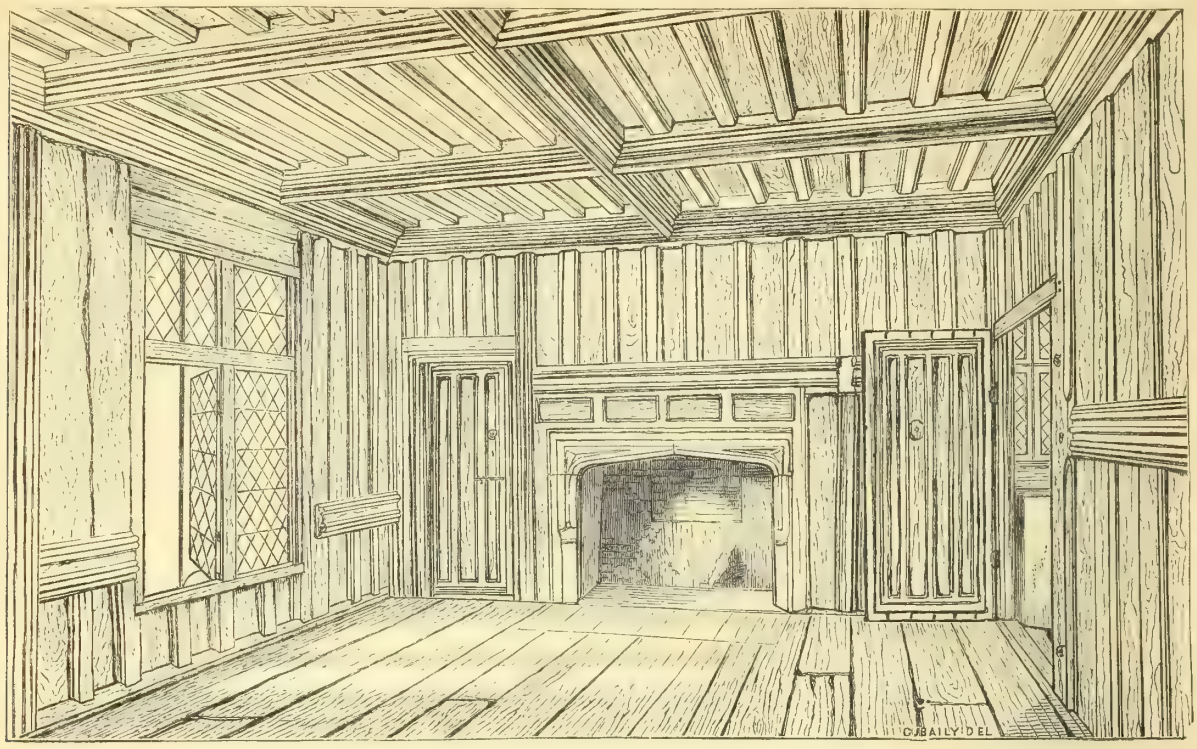
These trusses support the longitudinal timbers, the purlins, and the leon beams, which in their turn carry the common rafters and all the minor timbers. The seat of the old louvre remains in the upper part of the roof; in the plan it is a hexagon.

The room over the parlour at the lower end of the hall, as may be seen by reference to the plate on page 132, is in a very genuine and original state; the only thing which is wanting being the original window. All the other features appear to be very much in the state as when left in the fifteenth century by the builders. In the sides of this room is to be seen the wooden construction of the walls of the house, the whole of which is internally moulded and finished in such a manner as to prove that it was intended to be seen without any further finish, except as regards the hangings of arras or tapestry. The construction of these timber sides has been already noticed, but it is necessary here to give some further description. On a level with the floor generally, but in the outer side wall at about four inches above it, is the top surface of the sill of the framing, into which the lower ends of stud-quarters or puncheons are tenoned: these quarters rise to about half the height of the sides of the room, where a horizontal moulded entertie is introduced, from which another range of quarters rise, and support a head or plate, which, overhanging on the inside, is moulded so as to form a cornice round the room; between these quarters or puncheons are introduced, and form two ranges of long upright panels. The puncheons measure about 5¼in. wide by 3½in. thick, and are about 6½in. apart; and the panels are about 1 to 1½in. thick.

The framing of the floor above, the under side of which forms the ceiling of the chamber, has principal and secondary girders, the whole of which are moulded and united with and framed into the plates or solid cornices. By these girders the ceiling of the room is divided into eight large panels. The ends of the joists, which measure 6in. wide by 6in. deep, are tenoned into the sides of these main timbers, and are hollowed on the lower edges. The large girders measure 13in. wide and 15in. deep. The floor-boards of the room above are laid in a direction parallel with the joists, the upper angles of which are rebated to receive the edges of the boards. This mode of laying the floors was the most usual one adopted by the carpenters in the middle ages, and it has some advantages over the modern system. It economises the quantity of boarding, inasmuch as the tops of the girders and joists form parts of the floor-surfaces; and as the under sides of the boards are exposed to view in the lower rooms, there are but few transverse joints to shrink and open, whereas in the modern plan, where the boards are laid across on the tops of the timbers, the joints are numerous. The old system has, however, its disadvantage; for the boards being nailed and fastened on the edges only, are very apt to warp and cast, and thus to render the floor very uneven; and when the oak timber is used in an unseasoned state, the centres of the boards are likely to split. In some cases, which have been found in old houses, of floor-boards laid transversely with the joists, the edges are rebated together, to break the joints.

The large apartment at the upper end of the

* Read before the Architectural Association, Jan. 14, 1870.—(Continued from page 110.)



ROOM OVER PARLOUR, CROWHURST PLACE, SURREY.

hall has also a finely-framed timber ceiling, with girders and plates; and here the joists are moulded to a much greater extent than in the last-described room, and are also of larger dimensions. A large amount of the original painted decoration is still to be seen on the under sides of the boards, between the joists; these are coloured in lozenges, alternately of red and white, perhaps the livery colours of the Gaynesfords.

This room measures 29ft. long by 17ft. wide, and it is 9ft. high in the clear, beneath the the girders.

The chimney-piece in this room is not of so early a date as the original house. It most probably replaced one of older date, early in the reign of Queen Elizabeth.

In this room we do not see the timbers of the construction of the walls; the sides are roughly plastered, and a quantity of framed wainscotings is fixed over some parts. This is also the case in the rooms in the upper floors of this wing of the house. Some of these wainscotings have the panels worked with the linen fold or drapery pattern, and are of a later date than the original house. Independently framed and pannelled wainscotings did not come into fashion before the end of the reign of Henry VII., and we very often find that these do not exactly fit the buildings in which they are placed. The fact is, that the wainscot and the window-glass, and other fittings, were often the property of the occupier, and were formerly treated as we now treat tenant's fixtures, and were removed from house to house.

"Item, I geve, will, and devise unto my said weif, the use and occupation of all my waineskott and glasse in and about my mancion and dwellinge howse in Melford aforesaid, to be and remayne as they nowe are, and by noe meanes to be removed or altered; and alsoe the occupyinge of the hanginges of tapestry which serve for my great chamber of my saide house, for forty yeres, yf the said Mary shall so longe live; and after that tyme I give the same waineskott, glasse, and hangings to the said William my soune, his executors and assignes; but yf the sayde William dye within his sayde age and without yssue male, then I geve and devise the same, after the same tyme, whollie to the said Walter my soune, at the said age of one and tweatie yeres"—See the Will of Thomas Clopton, A.D. 1598.

Many of the original doors remain in use: these are all formed of oak boards about 1½in. in thickness, placed upright, and fastened on to horizontal ledges five or six in number, the ends of which are framed into side styles; on the fronts of the upright boards are nailed moulded fillets so as to cover the joinings, and mitred, with others to match at the tops and bottoms of the fronts, giving the effect of long upright panels. These doors, both externally and internally, are all hung in the openings with very strong hook hinges, the straps of which pass across the fronts of the doors beneath the moulded fillets. There is one peculiarity in all these doors; it matters not whether they are three, four, or five panels wide, in all cases the side panels are much narrower than those between them; the jambs and heads of the openings are not independent frames, but are the timbers of the construction of the framed walls, and moulded in a conspicuous degree to form the door-openings. The fastenings are latches, lifted on one side by a ring handle on a plate. There are bolts of a rude character on the insides.

It is somewhat remarkable that the plain or ledged sides of the doors are placed next the rooms, and have a very rude appearance, the moulded fronts being on the outsides. The doors, however, on the insides were probably always covered with hangings, which, in such situations, would be of more real use than in the other parts of the room.

(To be continued.)

NEW TOWN HALL, BRADFORD.

FRONT VIEW.

WE this week give another view of the first premiated design for the proposed new Town Hall for Bradford. We gave the view from Leeds Road on Nov. 19, 1869, and an interior view on Dec. 17, 1869, and we now give the front view. On Oct. 8th and 15th, last year, we offered at length our opinion on this and some of the other principal designs submitted in competition, and it is therefore unnecessary that we should say anything now. Messrs. Lockwood and Mawson are the architects.

ARCHITECTURAL SOCIETIES.

EDINBURGH ARCHITECTURAL ASSOCIATION.—The usual fortnightly meeting of this association was held on the 10th inst. in the rooms 5, St. Andrew-square—Mr. William Beattie, architect, in the chair. After the election of several new members, a paper was read by Mr. W. Campbell, entitled "Plaster Work, Ancient and Modern." Mr. Campbell gave a brief historical *resume* of the origin and development of plaster work in ancient times, proving its extreme antiquity by a number of quotations from the Old Testament and various Greek and Roman authors. Among existing specimens of old plaster work, few remain anterior to the Gothic period of architecture. Mr. Campbell called attention to a number of fine examples of old work to be found in Edinburgh and its neighbourhood. In concluding, he pointed out the chief deficiencies of modern plaster work, and gave some valuable practical hints as to how these might be remedied. A discussion followed the reading of the paper, and the thanks of the meeting were awarded to Mr. Campbell.

LONDON ARCHITECTURAL ASSOCIATION.—At the usual fortnightly meeting, on Friday evening last, Mr. Lacy W. Ridge, President, in the Chair, Mr. Charles G. Mailard was elected a member. Votes of thanks were unanimously given to Mr. Sidney Smirke and the Benchers and Treasurer of the Inner Temple for the facilities afforded by those gentlemen for the recent visit of the Association to the New Inner Temple Hall. A letter was read from Mr. W. Burges regarding the designs for the cover of the Association's Sketchbook, on which he had been requested to adjudicate. Mr. Burges said that, after having carefully examined the various drawings submitted in competition, he had come to the conclusion that the one marked "L. M. Z." came nearest to the conditions required by the Committee. (Mr. Isaac Jones was announced as the author of this design.) Mr. George Augustus Sala, who was to have lectured on "The Bed of the Tiber," was precluded from attending by illness, and the time of the meeting was very profitably filled up by Messrs. Birch (Librarian) and Phené Spiers drawing attention to the contents and uses of the more prominent of the books in the Association's library. It was announced that the members would visit the works of the new St. Thomas's Hospital, Westminster-bridge, to-morrow (Saturday) afternoon.

SAFETY FROM FIRE.—The *Northampton Mercury* in an article on "Recent Disastrous Fires" suggests an improvement. In France, the use of tiled and plastered floors in the upper rooms often prevents a fire from extending beyond the story in which it commenced. In very lofty and costly houses perhaps something of this kind might be adopted, the stairs being rendered similarly non-combustible. But might not such houses also be required to have an iron balcony to each of their upper stories, with apparatus so contrived that part of it may be let down in the nature of a ladder to the balcony in the next story below, and so on until the persons escaping came within reach of assistance from the street? Perhaps the lowermost balcony might be contrived to turn so as to project forward from the house into the street, safely landing the persons in peril without any assistance from without whatever. If the Salisbury Street house and the Star and Garter at Richmond had been furnished with some contrivance of this sort, every life sacrificed in these two places would, it is almost demonstrable, have been saved.



FRONT VIEW.—PROPOSED NEW TOWN HALL, BRADFORD.

LOCKWOOD & MAWSON, ARCHITECTS.

St Albans Abbey.

St Albans, Hertfordshire.

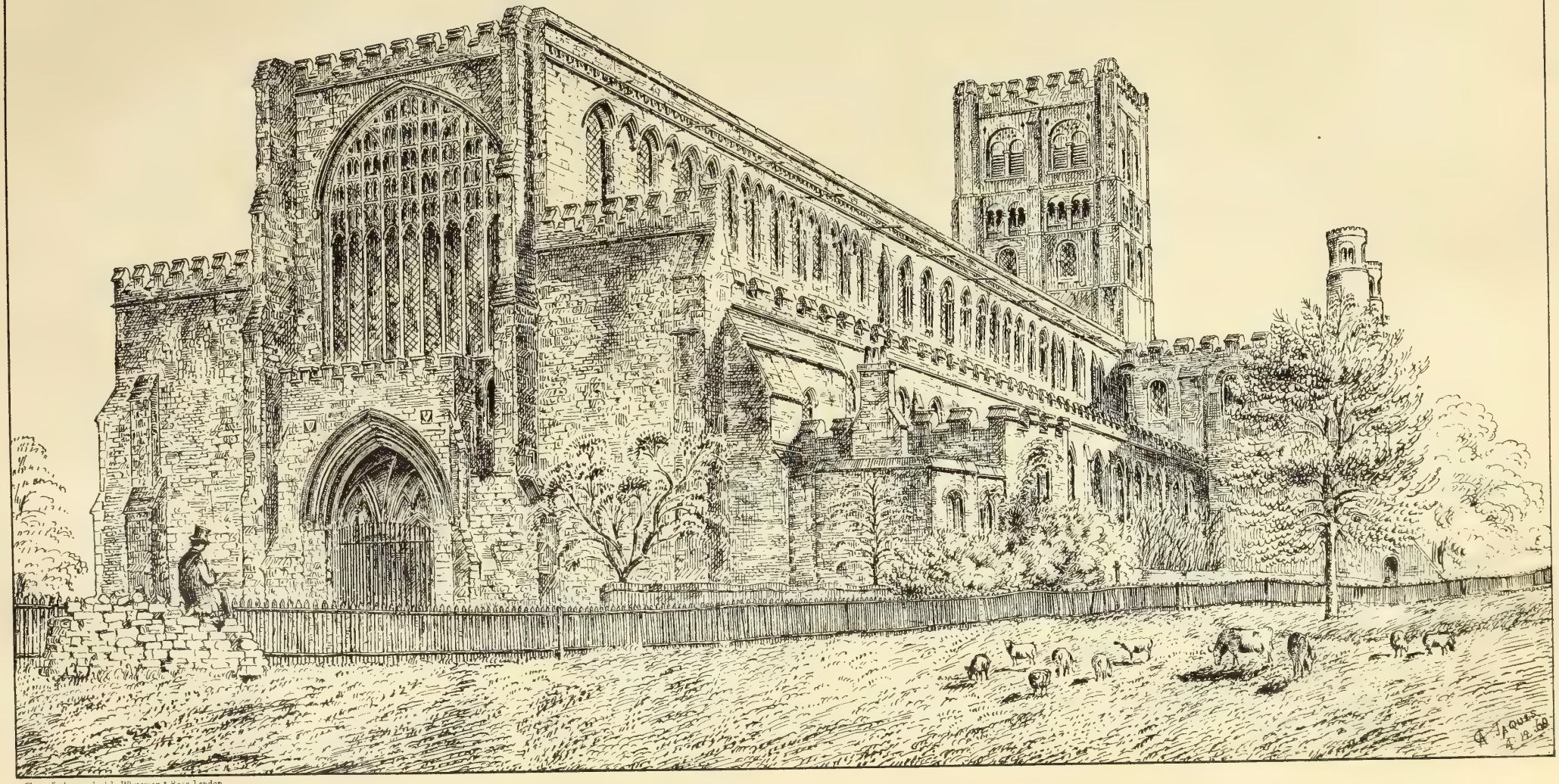


Photo-Lithographed by Whiteman & Bass London

Furniture & Decoration.

THE THEORY AND PRACTICE OF MODERN HOUSE PAINTING AND DECORATION.

HAVING briefly touched upon some of the causes which have prevented us taking our proper place in relation to the decorative arts, I would (before commencing the practical portion of these articles) say a few words as to the influence and practice of schools of design. I find that in 1868 there were in the United Kingdom, 18,474 art students, of whom 6478 came up for examination, and 3961 of these passed. Looking at the above figures, one would naturally conclude that our arts and manufactures must be greatly benefited, and that the influence exercised by the number of skilled designers, modellers, decorative artists, &c., is represented by the number of poor students who are thus encouraged and rewarded year after year.

Is it so? Are the results at all adequate to the means employed and the cost thereof? I am afraid the question must be answered in the negative, and am constrained to think that the 3961 prize-holders do not represent the true state of the case, but that a very large majority is simply representative of mediocrity and success in mere routine studies. The head-master of the Manchester School of Art, in his annual report for 1869, says :—"Occasionally there are students of both sexes, who exhibit a most unmistakable predilection for the higher walks of art, and in such cases I have felt it my duty to assist them in their purposes to the best of my ability, watching and directing their doings. From what I have just said it will be inferred that the study of ornament as a speciality is only agreeable to the few."

Now I want to know why it is only agreeable to the few. There must be some radical defect somewhere, when the study of the ornamental arts is made so unattractive, that the very purpose for which such schools were established is only agreeable to a few of the students in so important a manufacturing district as Manchester. Between the few who study high art with a prospect of success, and the few who study ornament professionally there must be in the aggregate an immense number who attend the classes, go through the usual routine course, then vanish—making no sign. If I mistake not, these schools were expressly established for the purpose of encouraging the spread of the knowledge of ornamental design among the people, and to show the various modes of applying them to the different branches of trades and manufactures. Has this important object been strictly kept in view is a question needful to be asked at the present time. The study of the decorative arts have not been made attractive to the student; on the contrary, he has been flattered and nursed and helped until he begins to despise the arts of design and to look upon high art as alone worthy of his devotion. It is a natural desire of all young artists to rise to the dignity of high art, but experience teaches that there are comparatively few who rise above mediocrity, and if we compare these few with the number of students attending our schools of art we shall, I am inclined to think, have discovered one fruitful cause of the small number of designers and decorative artists turned out by the present system. A feeling of contempt for the useful arts is, negatively if not positively, encouraged by the masters; as a rule they are themselves followers of high art, and they either will not, or do not, care to take the trouble to discriminate between those students who are calculated to shine in high art and those whose time and talents would be better employed in gaining proficiency in some branch of the sister arts. There are hundreds of advanced students who waste their time and injure their prospects in the vain pursuit of the higher branches of art, who, if they would only devote the same time and energy to the acquirement of some of the useful arts, would rise to eminence and wealth. It is the duty, as well as being a wise policy in the state, to encourage the highest phase of art education, but it is still more incumbent upon the state to see that the instruction given in aid of the more useful arts is such as is best calculated to answer the end in view. There ought to be a competent Government inspector appointed to a certain number of schools, whose duty should be to himself examine the pupils, and see that the purpose for which such schools were established is properly carried out; there is as much harm as good done by the present system. Out of a large number of students whom I have known, and who have received instruction in these schools, I should have much difficulty in naming half-a-dozen who at the present time occupy anything of a position in decorative art. I would not have the aspirant to honours in high art discouraged, but he should show the necessary qualifications unmistakably before such encouragement should be given to him as will lead him away from the equally important study of the decorative arts, for we shall find that if the student has the true metal in him, it will come out in spite of all obstructions. Therefore until this is the case it would be well for the masters to direct the attention of the student (after he has acquired the necessary elementary knowledge and skill), to supplement the instruction received in class by the outdoor study of natural types of ornament. Plant and flower should be indicated, and a certain amount of botanical knowledge recommended; these studies should be directed to the improvement of the special manufactures of the district in which the school is located. It will be found, as a matter of course, that the particular bias of each student and his peculiar talent will soon show itself in such studies, and it is the duty, and ought to be the pride of the master to show a wise discrimination in directing each student in the path he is best calculated to shine in. It is folly to suppose that the same course of instruction is suited to all. As well say that the same course of study is suited to the painter of landscape as to the historical painter, for the designer of patterns for lace and the stone carver, for the worker in silver and the mechanical draughtsman. The elementary course may be so, but after that stage the individual character of each student begins to tell: some will plod on with unwearied patience for twelve months on a simple drawing which others would finish in a sixth of that time, others show qualifications for minute and elaborate finish, others for bold dash and force. Some will be fitted for pattern designers or ornamental painters, others again will show aptitude for stone and wood carving or the plastic arts, and so on. This being so, is it not the height of foolishness to compel every student to go through the same course, whatever his talent may be, or whatever trade or profession he may be intended for? It is high time this system was altered. There are some few schools, at the head of which Nottingham stands pre-eminent, where the masters, and consequently the students, have recently been treading in the right path, and the result is that these schools stand at the head of all others in the kingdom for original and applied design. It is evident that if these desirable results can be brought about at Nottingham by a proper and legitimate system of teaching, there can be no reason why the same system should not have the like results in other localities; instead of which the majority go blundering blindly on in a mistaken path, ending in disappointment with all concerned, simply because they have not been better taught. It will be said that there must be and is a large amount of good done with this vast machinery for art education. Granted, then, that it is so to some extent; but I hold that in the main it is a negative sort of good. We plant the tree and water it, and it may possibly rise above the ground, but it bears no fruit; at least the average crop is so small that it is not an adequate return for the outlay. This may appear strong language in face of the 3961 prizes given in 1868, but the question only requires to be looked properly into, when it will be found that the above is rather under than overdrawn. The remedy is in the hands of the art authorities, and should be at once exercised. It is our own fault if we continue to occupy an inferior position much longer. I have a feeling of shame, as an Englishman, that we should be behind any nation, especially when I am convinced that our artisans only require to be properly taught to enable them to stand second to none.

THE HISTORICAL DEVELOPMENT OF ART.

THERE has just been delivered at Glasgow a course of three lectures on the "History of Art," by Dr. G. G. Zerffi, who is at present lecturing at the South Kensington Museum, which deserve some notice as being the first of the nature which have yet been delivered in that city. The large upper hall of the Corporation Galleries was filled each evening with an audience composed partly of students of the School of Art, and partly of ladies and gentlemen otherwise interested in the subject. At the opening lecture on Saturday, 15th January, the Lord Provost occupied the chair, and in introducing the lecturer explained that the course of lectures had been arranged for jointly by the trustees of Haldane's Academy of the Fine Arts and the Glasgow School of Art. Dr. Zerffi then proceeded with his lecture, which was entitled "Prehistoric Art." In his preliminary observations he urged the importance of art students studying the distribution and development of the human species. He then continued somewhat as follows :—

The entire human family may be conveniently divided into three great classes or races, viz.—The white, the yellow, and the black. In many respects besides colour they are widely separated from one another. The average size of brain, for instance, is in white nations 92 cubic inches, in yellow 88, and in black about 80. Their heads, too, are of different shapes, the facial angle of the first being about 90°, of the second 85°, and of the third 83°. The face of the first is nearly oval, of the second it approaches to square, while of the third it is more nearly triangular.

In black nations, the cerebellum or back part of the brain is more highly developed than the cerebrum, or front part. The former is the seat of the passions, the latter, of the intellect, and it is evident to ethnologists that in mental power the black races can never approach the white.

The human mind is composed of two leading forces, the moral and the intellectual, the first static, the second dynamic. These vary in degree and proportion in different nations, and those which have most successfully maintained the balance between them, have risen highest in the social scale.

Art, of every description, and in every case, has arisen from necessity. It has its origin from the earliest times, and may be called, in fact, a protoplasm. The savage ornaments his face with frightful cuts and scars with the view of inspiring terror into the minds of his enemies. This is natural, and the same intention may be traced in our grenadiers' caps. Art is always imitative. In the earliest times men dwelt in caves, and when they found these inconvenient, they imitated caves in their buildings. We find, too, that tombs resemble dwellings. When a man lost a dear friend, he was desirous of providing for him a house like his own. Some ancient tombs have been found to bear a remarkable resemblance to the present houses of the Esquimaux. They are in the form of the letter ⅂, and their length, in both instances, is exactly four times their width. The rude masses of stone which compose Stonehenge are about 22ft. high, and the entrance to a Scandinavian house is composed of stones exactly the same height. These are not the results of accident, but as we calculate so many diameters to the height of a column to attain the proportions of the Greeks, so our forefathers constructed their monuments and houses by similar laws.

Mexican art is also included in the term "prehistoric," and is the highest form of it with which we are acquainted. We are unable to affix a date

to it, but we can trace its development from a barbarous state to one of high cultivation. There are some finely-formed heads, which are the work of true artists, and show great mental culture. One figure bears a remarkable resemblance to the Egyptian Sphinx. They also built pyramids, for astronomical and religious purposes, which are inscribed with a species of sign-writing, which bears some resemblance to Egyptian hieroglyphics; we find on it their own signs of the Zodiac, and a figure of a man bearing what has been supposed to be a telescope, but which may be only a stick. It is certain that they were possessed of a knowledge of astronomy which must have taken not individuals, but generations of individuals, to amass.

In concluding, the lecturer again urged the necessity of a more extended knowledge of the progress of art in other countries, and a deeper insight into the laws which regulate its development. He said we should reason from generalities, and try to discover the cause of every effect. This it was which distinguished a true artist from a mere draughtsman.

At the close a cordial vote of thanks was awarded Dr. Zerffi, on the motion of the Lord Provost.

The second lecture of the course was delivered on the 22nd January, Sir James Lumsden presiding. After a few remarks by the chairman, Dr. Zerffi proceeded with his lecture, the subject of which was "Eastern Art." The following are some of his remarks.

The Indians are our forefathers, and our language, in common with many others, is based on Sanscrit. This may be seen by the similarity of sound in comparing the cardinal numbers, the first tenses of the verb "to be," &c., in the different languages. Celt, or more properly Kelt, for Sanscrit contains no C, signifies in that language "to domineer," and many other instances might be given.

The religion and art of a country are usually founded on its natural scenery. Thus the scenery of Hindustan is varied, luxuriant, and fertile, and their religion partakes of the same nature. They possess an abundance of wonderful and supernatural deities. Their architecture, also, is, too imaginative and luxuriant. Their temples are forests of pillars laden with sculpture.

But while the arts of a country may be traced to its scenery, we must not forget that their development is gradual. In this respect a nation may be compared to an individual. Looking back to our childhood, we remember some time when we first became aware of our existence; when we awoke to consciousness of ourselves and of the world around us, when our minds opened to two great ideas of time and space, both extending to infinity. The childish mind, and, in like manner, the nation at a corresponding period, observes three great phenomena: 1st. Things suddenly arise, it knows not whence = Creation. 2nd. Things sustained, or kept in existence, it knows not how = Preservation. 3rd Things destroyed or cut off it knows not whither = Destruction, or more, properly, Transformation or Transmutation. In the religion of the Hindoos, therefore, we find that their three great deities are representations or embodiments of these three primary ideas. But the last, as being the most powerful and most terrible, they place first. It is symbolised by fire, and represented by a triangle, point upwards. The second, or preserver, was coloured blue, from water being a great fertiliser, and represented by a triangle, point downwards. The third, or creator, is represented by a combination of the two triangles, which is the origin of the Freemasons' badge signifying existence or "I am."

Neither science nor art can ever flourish under a despotic priesthood. This is strongly marked on the Indian temples erected before the advent of Buddha. Their religion was so fettered by laws that the fine arts could scarcely exist. Buddha strove to abolish caste and to establish liberty, and a more intellectual form of worship, and the architecture of this period shows a great advance over the preceding; we find in it many points of resemblance to Gothic. They possessed the Gothic arch, simple, and trefoiled, with Gothic aisles and altars. To give some idea of the influence of this movement, it may be stated that the number of Buddhists now in existence is estimated at 400,000.

Egyptian architecture is huge and colossal. Their pyramids are artificial mountains. To erect a tomb to one man, 360,000 men laboured for 24 years, and nothing could better indicate their national character and form of government than that fact. The obelisks are their finest works, and have been said to point to eternity. It has also been said that they are an embodiment of a ray of light, conceived by Sesostris. The Sphinx in Egyptian art stands alone; there is nothing else like it; and it is to be particularly noticed that its features are not Egyptian, but Arian. It cannot therefore be ascribed to Egyptian artists.

In Persia art attained considerable development. The Persians are Arians, and seven out of ten words in that language are derived from Sanscrit. In their places of worship they symbolised, not the Deity, but his attributes. Their palaces are of the most magnificent description, and are perhaps unequalled in profusion of carving and coloured decoration.

Chinese art is highly quaint and ingenious. They observe Nature closely, and imitate leaves and flowers. But they have no sculpture. The figure of a Chinaman in a statue would appear grotesque. Their minds are childish, and they have no conception of the higher walks of art.

After votes of thanks to the lecturer and chairman, the meeting was concluded.

On Saturday, 29th January, Dr. Zerffi delivered the third and last lecture of the course, Mr. John Blackie, jun., occupying the chair. The subject was Classical art, and the following were among his observations:—

We have seen in the foregoing lectures that Eastern art, after progressing to a certain point, remained stationary, and it is not difficult to discover that the cause of its arrest was despotism either of religion or of rulers. The Jews, for example, were forbidden by law to carve or engrave, and they entertained a horror of building from their bondage in Egypt, and their compulsory labour there. So that this nation possesses no art whatever. Jews are often picture dealers, but never picture painters.

But in Grecian art we find something higher than all that went before—nay, higher, it is asserted than all that has followed it. And Greece was distinguished from all other countries by the most perfect liberty. But let us consider first, as in Indian art, the nature of the country. In looking at the map of Greece, we are struck by the great number of inlets of the sea, and of its islands. In short, Greece is distinguished from the rest of Europe, exactly as Europe is distinguished from the rest of world, namely, by the great extent of its sea boundary in proportion to its superficial area. And this means two things, firstly, the sea is the origin of many of our grandest thoughts and similes—it conveys the best idea of infinity; and secondly, it affords the greatest facility of communication. The Greeks seem to be a combination of the good qualities of the surrounding nations. They have the imagination of the South chastened by the simplicity and aided by the perseverance of the North. Added to these are the learning of the East and the love of freedom from the West. Their country, too, is one of extreme beauty, for without natural we can never have artificial beauty, Art being completely imitative.

The Doric order arose in the North, and is an example of massive simplicity. In the earlier stages of Grecian architecture, the interiors of the temples were exceedingly plain, while the outsides were adorned with magnificent porticos and colonnades. The Greeks of that time took greater pleasure in walking among the stately columns, and indulging in philosophical speculations, than in worshipping inside. Their temples, in short, occupied the same position to them as coffee-houses did to the literary men of last century. As time went on, however, and a more elaborate and ornamental style began to creep in upon and mingle with the simplicity of the Doric, the embellishment, at first confined to the outside, extended to the interior also, until ornamentation, which might be called the music of architecture, became a marked and prominent feature in their designs.

In Grecian sculpture we find something more than a mere imitation of Nature. Their statues are a harmonious combination of a thousand beauties in which race and sex are alike forgotten. If it had not been so they would have appealed only to Grecian sympathies; as it is, they speak to the whole world and to all time. The sentiments of beauty they raise in us are of the most refined order. A Grecian actor was fined or imprisoned if his audience wept. "Our actors," they said, "shall raise us above tears." In the same manner, the group of the Laocoon is shown in the first stage of agony, when it was grand, but before it had become horrible.

Poetry precedes painting and sculpture. If the Greeks had not had Homer they would never have had their great artists. The arts of a country are but an embodiment of its poetry, and it is by studying our own Shakespeare and Milton, that we can attain to what the Greeks attained by studying Homer.

The chairman, in afterwards moving a vote of thanks to Dr. Zerffi, said they were all greatly obliged to the committee of the Haldane Institute for the enterprise they had shown in getting up these lectures. Even those who had made art the study of their lives, would be benefited by the knowledge and grasp of subject displayed by the lecturer; while their young friends would find new fields opened up to them for thought and reflection Dr. Zerffi acknowledged the compliment.

ROUGET'S FIXATIVE PROCESS.

IN the month of March of last year Professor Rouget, one of the Masters in the Government Schools of Paris, made a discovery, which in its effects will be invaluable to artists and the art world in general; indeed, it appears to us that this useful invention requires only to be known to be at once fully appreciated, and we gladly take this opportunity of mentioning it to our various readers. It is a rapid and apparently perfectly safe method of fixing chalk, charcoal, crayon or pencil drawings, by means of a particular fluid blown through a glass syphon in the form of a fine spray, on to the material to be fixed. The paper on which the drawing is made is not injured by the fluid; on the contrary, it is preserved by it—in fact, one of the great uses of this fixative process is supposed to be the preserving of the paper and colour of water colour or other drawings from decay. The apparatus is in itself of a very simple character, a child might learn to use it, and it is likewise very portable. The process has been warmly taken up by many distinguished French painters, architects, and draughtsmen; amongst others, we may mention Gerome, Cabanel, Villems, Gleyre, Viollet-le-Duc, and Gustave Doré; it has also been used by some well-known artists in this country, and they have expressed themselves well satisfied with the results. It was tried this summer on a crayon sketch of a sunset, and the glowing colours were not in the least injured. This is an example of the undoubted benefit of this process to the painter, for with its aid he may rapidly draw in sunset effects, with that most rapid of mediums, coloured crayons, and keep them by him as studies for ever, as bright and uninjured as when first executed. There is another agreeable quality in this process: when the drawing has been fixed, it is quite easy to work upon it again and again, providing only that the parts worked upon be finally blown over with the spray when the drawing is quite finished. Architects will find this apparatus most useful in fixing their rough pencil sketches and more elaborate drawings of architectural details. The very simple rules for using Professor Rouget's process are sent with it, packed altogether in a neat little box. The London agents for the apparatus are Messrs. Corbière, 30, Cannon-street.

PARLIAMENTARY NOTES.

THE SITE OF THE COURTS OF JUSTICE.—Mr. Headlam, on Friday last, asked the First Commissioner of Works whether he would state what were the intentions of her Majesty's Government as to the site of the intended Courts of Justice, and as to the plan of the building. Mr. Ayrton said Mr. Street, the architect of the new Courts of Justice, was now engaged, under his direction, in preparing plans for the purpose of constructing the courts within the limits of the site prescribed by the act passed in the year 1865, and also within the limits of the votes provided by the act passed in the same year. This was a very difficult work, requiring a great deal of time and attention; but he had no reason to doubt that Mr. Street would in the end succeed in fulfilling his instructions. Assuming that the requisite consents were obtained for proceeding with the work, and that the plans were approved, he saw no reason why the work should not be commenced at an early period. At present they had not arrived at the point when he could tell his right hon. friend exactly what the plans and arrangements were. Mr. Headlam inquired

whether it was part of the scheme to have a communication from the south to the north side of the Strand. Mr. Ayrton said that was part of the question which he could not answer, because Mr. Street's report as to details had not been received. If, for instance, no funds were provided by parliament for making such communication it obviously could not be carried out, however desirable it might be. This point would of course be considered in connection with all other matters relating to the bill.

THE NATIONAL GALLERY.—Mr. Beresford Hope asked the First Commissioner of Works what steps her Majesty's Government had taken or propose to take for the purchase of a site for the enlargement of the National Gallery, for which votes had already been taken ; and whether it was intended to proceed at once with the new building. Mr. Ayrton stated that Her Majesty's Government and their predecessors in office had taken the requisite steps to acquire the site which had been provided by the several Acts of Parliament passed for the purpose ; and he believed the whole of the land would be obtained before the close of the present financial year. But the Government had not been able to consider fully what steps were to be taken for the purpose of erecting the new building. They had hardly yet arrived at a conclusion on that matter.

THE THAMES EMBANKMENT.— Captain Grosvenor asked the Chancellor of the Exchequer whether the Lords of the Treasury concurred in so much of the 47th Report of the Commissioners of Her Majesty's Woods and Forests and Land Revenues, presented to Parliament June 29, 1869, as recommended building upon property belonging to Her Majesty upon the Thames Embankment, to the extent of 2 acres 2 roods 19 poles, or whether arrangements would be made to deal with this portion of Crown property in the same manner as the remainder of the site acquired by the Metropolitan Board of Works was dealt with in the Thames Embankmeut Act, by which Act such remainder was set apart in perpetuity for purposes of public recreation. The Chancellor of the Exchequer.—Eleven acres of land below high water-mark, belonging to the Crown, were taken for the purposes of the Embankment. Of those 11 acres the Crown has retained 5½ acres, but it has received no compensation for the remainder. We do concur with the recommendation in the report of the Commissioners that buildings should be erected on two acres and a half of the 5½ acres, the property of the Crown. I do not think it would be right to lay out in gardens so valuable a piot when it may be devoted to buildings and produce money which may be applied in relief of taxation.

STREET TRAMWAYS.—On Friday last in the House of Lords, Lord Redesdale observed that if at the first introduction of the railway system into this country there had been some general inquiry and some little supervision on the part of the Government, few persons would dispute that a great saving of expense and a great public benefit would have been the result. At this moment a new system of locomotion was on the point of being inaugurated. In 1867, a bill was passed for a tramway in Liverpool, and in 1869 three passed for tramways in the metropolis. This year, however, there were no fewer than 24 bills, involving a share capital of two millions, and borrowing powers amounting to £800,000 more. Seven of these re ferred to London, and their object was the construction of lines extending to 145 miles, and an expenditure of a million and-a-half of money. No question, therefore, could arise, as to the importance of the system which was about to be begun. He understood that the London lines authorised two years ago would in a few months be opened, and he suggested that, without putting the companies to any additional expense, no further progress shall be made with the bills now before Parliament till there had been time to gather some experience on the subject. (Hear, hear.)—The Earl of Kimberley was not in a position to make any positive statement, but he would take care that the suggestions of the noble lord should receive due attention from the Board of Trade. At the same time, he might observe that the tramway in Liverpool was said to be very successfully at work, and was found to be free from any objections. He understood that the new rail which had been invented did not involve the inconveniences that were found to exist in that of Mr. Train.—Earl Grey hoped the house would seriously consider the question whether, if it was desirable that the street tramways should be constructed, it was expedient to leave them in the hands of private companies rather than in those of the municipal authorities. (Hear, hear.)

EPPING FOREST.—On Monday evening in the House of Commons, Mr. Fawcett moved an address to the Queen, praying her Majesty to defend the rights of the Crown over Epping Forest, in order that it may be preserved as an open space for the recreation and enjoyment of the people. Mr. C. Buxton, Mr. B. Hope, Mr. Samuda, and Mr. Kinnaird dwelt with force upon the argument derived from the consideration of the public good, and represented the mischief which must result from the enclosure of Epping Forest ; and Mr. W. Cowper Temple, entirely concurring in this reasoning, denied the propriety of the abandonment by any Minister of the rights of the crown ; and suggested that some arrangement should be made by which a portion of the forest might be surrendered to the lord of the manor and the copyholders, while the remainder should be preserved for the use of the public. Mr. Goldney was the first to say a word against the resolution, which he represeuted as an attempt to do indirectly what ought to be done directly ; and he pointed out that the mere enforcement of the Crown rights would not secure the enjoyment of the forest to the public. The Solicitor-General fully recognised the importance of preserving Epping Forest as an open space, but he strongly impressed upon the House that the assertion of the Crown Rights, which were of a very limited character, and could not be enforced without great difficulty, would not secure the object which the member for Brighton and those who had supported his motion had in view. Sir J. Coleridge's exposition of the law did not at all satisfy Mr. Alderman Lawrence, who inveighed against it, and asserted the paramount rights of the people with something more than vehemence ; but Mr. Gladstone, while defending the course adopted by his law officer in informing the House as to its exact position with regard to this question, frankly admitted that it was the duty of the Government to move in the matter, and promised that they would take it in hand. At the same time he suggested an amendment in the terms of the motion, which, while not affecting its general purport, would leave the Government more freedom of action as to the measures to be adopted for the attainment of its object; and this alteration having been accepted by Mr. Fawcett, the resolution was agreed to without a division.

THE CRYPT OF S. STEPHEN'S.—Lord Ernest Bruce asked the First Lord of the Treasury whether some arrangement could be made for the celebration of Divine Service in the crypt of S. Stephen's now perfectly ready for that purpose, on Sundays, during the session of Parliament. Mr. Gladstone said the crypt had been prepared with considerable expense ; but it remained with the House of Commons rather than with the Government whether it should be opened for divine service. The Government were not prepared to make any proposal on the subject.

PURIFICATION OF THE SERPENTINE.—Mr. Dyce Nicol asked the First Commissioner of Works whether the levelling and purification of the Serpentine were being done by contract ; and, if so, what date was fixed for the completion of these works? Mr. Ayrton said the works, which were done by contract, would progress unless interrupted by the weather.

VIADUCT OVER THE THAMES EMBANKMENT. —Lord Elcho asked the First Commissioner of Works whether, in pursuance of the recommendation of a select committee of last session, it was his intention to bring in a bill to relieve the Metropolitan Board of Works from the obligation to construct a viaduct on the Thames Embankment from Hungerford-bridge to Wellington-street, Strand. Mr. Ayrton said he had strongly objected to the construction of the viaduct from Somerset House, and he had not altered his opinion since he came into office. He had called the attention of the Metropolitan Board of Works to the recommendation of the committee on the subject. As to the second part of the noble lord's question, the case was whether it was desirable to alter and take away from the local authorities a power they possessed for 15 years. It was not his intention to take any steps in pursuance of the recommendation of the select committee.

A new Primitive Methodist chapel is to be erected in King-street, Margate, and a portion of the Cliftonville estate, in the same town, has been selected as the site of a proposed new church.

SCHOOLS OF ART

CIRENCESTER.—The distribution of prizes gained by students of this school took place on Tuesday week. Mr. H. Zachary, secretary to the school, commenced the business of the evening by reading the report, which was most gratifying. The chairman having reviewed the chief features of the report, an address was delivered by Mr. T. S. Bazley, of Hatherop Castle, Fairford, after which Mr. Bazley distributed the prizes. In the third grade, advanced and elementary sections, the works of the following students had been examined at Kensington and pronounced satisfactory:—Wm. Gardner and Edwin Tarrant, to whom prizes were now awarded, the work of the latter having also been selected for national com petition ; Ebenezer Barnard, Henry Barnes, R Embury, Kate Fassbender, Sarah Gibbons (N.C.), Francis Gibbons, Martha A. Herbert, John Healer, Bessie Hamblett, Julia Jefferies (N.C.), Wm. Powell, Annie W. Pagett, William Simpkins, William Taylor, John Whiting, and Charles Waters. In the second grade, awards for time drawings before the committee, the following registered "excellent" and received prizes ;—Edward Millar and Leontine Olive, in freehand ; Henry W. Barnes, E. Beecham, and L. Olive, in geometry ; Kennett J. Beecham, in perspective ; and Francis Gibbons, in mechanical. In the same grade ten students registered "passed" and received cards for freehand, two for geometry, one in perspective, three in model, and one in mechanical drawing. Certificates were presented to H. W. Barnes for four subjects, and to Francis Gibbons for the fifth subject. In the Yellow and Quarterly Schools 57 gave satisfactory evidence of having been taught drawing, while 45 registered as having shown proficiency, and 7 registered excellent and received prizes. In the British School, the number showing evidence of having been taught drawing was 20, 15 registered proficient, and 6 excellent.

BIRKENHEAD GOVERNMENT SCHOOL OF ART. —The annual meeting of the subscribers to this institution was held on Tuesday evening. Mr. W. E. Hinde, the honorary secretary, read the report, from which it appeared that during the last year 161 students had received instruction, being an increase of ten pupils over the number taught in 1868. The Government had reported most favourably of the school, and the Committee of Council on Education, as a recognition of the satisfactory character of the year's work, had presented Mr. Bentley, the master, with a bonus of £10. During the year upwards of 1000 drawings had been executed ; the work of 87 students had been sent to London for examination ; 42 students were specially commended, and the works of seven selected for national competition, one of which was successful. At the annual examination conducted by the committee, 79 students worked papers in freehand drawing, practical geometry, model drawing, and linear perspective. Fifty-three of these papers had been successful. From the treasurer's accounts it appeared that the donations and subscriptions during the year amounted to £127, and the total receipts were £357. There appeared a small debt against the school ; and, in addition, there was a liability of £122, which had accumulated during the last two years.

SOUTH KENSINGTON DISTRICT SCHOOL OF ART.—The annual distribution of prizes to the students of the above school was made on Tuesday by the Prince of Teck, in the new lecture theatre of the South Kensington Museum. The proceedings began with a statement from Mr. Cole, C.B., upon the position of the institution. Mr. Redgrave, the Inspector-General of Art, delivered a brief address upon the advantages of art studies, remarking that the primary object of these schools was not the creation of great artists, although they had sent many pupils to the Royal Academy, but to make art still more a part of the general education of the people. At this time no fewer than 100,000 children were being taught drawing as a means of stimulating and developing the perceptive faculties, and he urged upon the students the necessity of making their labours serviceable to the manufactures of their country. For that purpose they should give a closer attention to the valuable works to be found in the museum. The distribution then took place. The gold medal and the Princess of Wales's scholarship were won by Miss Marianne Mansell. The two other gold medals by Mr. W. W. Oliver, and Mr. Harry S. Palmer. The silver medallists were Miss Edith Edenborough, Miss Kate Greenaway, and Messrs. C. E. Black, J. Harris, E. C. Slocombe, and W. T. Wilson.

Building Intelligence.

CHURCHES AND CHAPELS.

CANTERBURY.—In Nov. last a committee was appointed to make necessary arrangements for taking down and rebuilding the tower of the Church of Holy Cross, Westgate, Canterbury (which has long been considered in an unsafe state), and for completing the restoration of the fabric. Since their appointment the committee have received the report of the architect, Mr. W. White, F.S.A., regarding the contemplated restoration of this church, which is one of the most ancient and interesting in Canterbury. The works proposed are intended to complete the improvements commenced some ten years ago, and will consist mainly of external restorations, the rebuilding of the old tower, and the replacing of some of the windows. The church is now closed, the works having been commenced. About £850 will be required to carry the works to completion, and this sum is being raised by voluntary subscriptions.

SOUTHPORT.—The foundation stone of a new Infirmary and Local Dispensary is to be laid on the 28th instant, by the Mayor of that town, Samuel Boothroyd, Esq., who is also the honorary treasurer of the committee. The proposed design includes the following rooms and conveniences, viz., on the ground floor, surgery, dispensary, consulting room, surgeons' sitting-room, kitchen, scullery, pantry, &c., also one male and one female fever ward, each containing 7280 cubical feet, and affording accommodation for six patients; there are also adjoining the above wards, nurses' scullery, nurses' bedroom, 2 lavatories, 2 water-closets, and other conveniences, all of which are one story in height, and effectually shut off from the main portion of the building by means of well-ventilated corridors, and are approached from the outside by a separate entrance. The chamber floor contains surgeon's bedroom, 3 nurses' and servants' bedrooms, 2 bath rooms, 2 water-closets, nurses' scullery, 1 male and 1 female accident or non-infectious disease ward, the cubical capacity of each ward being 7280 feet, and capable of accommodating 6 patients, the same being well ventilated by means of six windows, 7 ft. by 3 ft. 6 in. from ceiling downwards, placed directly opposite each other, and containing pivotted apartments at the top, to open with rope pulls, &c. In the ceiling of each ward will be three cast-iron perforated ventilators, communicating with a blank air flue, by means of close boarded trough, with throttle valves in same to regulate the current, the inlets for fresh air being sliding air grids, 6 feet above floor, supplied by flues from the outside. Externally, the walls will be faced with the best stock bricks, set in mortar mixed with foundry sand, and relieved by Burnley stone heads and sills, &c., and Gothic pointed red and blue brick arches, and bands set flush with the brickwork. The architects are Messrs. Mellor and Sutton, and the sole contractors are Messrs. Wishart and Irving.

S. NEOTS NEAR LISKEARD.—A handsome reredos has just been placed in this church, and deserves notice from its being principally composed of hand-painted encaustic tiles. By this process the illumination is all burnt into the tiles, and has a surpassingiy rich appearance, which will stand the test of time. The length of the reredos is 19ft., and the height from the floor is 7ft. 6in. There is a panel on each side of the altar, crowned with a rich Perpendicular heading, and surrounded by an ample thorn leaf border on a purple ground. The panels contain Our Lord's Prayer, the Apostles' Creed, and the Commandments, all written in this imperishable manner on the tiles, and have a diaper ornamentation in sage green and buff around them, which harmonises well with the other colours. The space above the altar is divided into three compartments following the form of the larger panels—in the centre one a cross on a blue diaper ground, and in the others the wheat and vine intertwined with scrolls on a red ground. The texts on the scrolls are "My flesh is meat indeed, and "My blood is drink indeed," and at the four corners there are Evangelistic symbols. Running along the entire length of the reredos is the text, "Come unto Me all ye that labour and are heavy laden." It was presented to the church by a parishioner, and is the work of Messrs. Cox and Son, of Southampton-street.

STAINDROP.—A new Wesleyan Methodist Chapel was opened in Staindrop, on Tuesday last. The building is of stone, the style Romanesque. The interior has a wagon headed panelled ceiling, and is fitted up with open benches to accommodate 200 people. The architect was Mr. John Ross, of Darlington.

HORNCASTLE.—The new Wesleyan chapel at Horncastle, which was opened last week, is in the Italian style of architecture, and is built with brick in two colours, with dressings of Bath stone, its external dimensions being 96ft. long, 58ft. wide, and 35ft. high. There are 7 entrances, 3 to the body of the chapel, and 4 to the gallery. The gallery, which is semi-circular at each end, is reached by four staircases. The chapel accommodates 962 persons. There is also a large band-room and 5 class-rooms in the rear of the building. The chapel is warmed by hot-water pipes, and the band-room and class-rooms by open fires. The cost is about £4500. Mr. Waddington, of Burnley, Lancashire, is the architect; and Messrs. Walter and Hensman, of Horncastle, are the contractors.

EXETER CATHEDRAL.—The Dean and Chapter of Exeter Cathedral have just approved plans, prepared by Mr. Gilbert Scott, for the renovation of the building. The work is to be commenced forthwith, the choir being closed for the purpose. The choir aisles are to be seated, which has long been talked of; the choir itself being far too small to accommodate the congregations at the morning services. The present division of the cathedral by the massive antique and curious screen into two virtually distinct churches will, according to the plans passed, be adhered to. The dean and chapter have decided that the western facade shall not be touched, as to attempt the renovation of the ancient figures of saints in the niches would be the destruction of the architectural features of the building. The subscriptions already raised towards meeting the expenses amount to several thousand pounds. The Exeter Diocesan Archæological Society entirely disapproves of Mr. Scott's plans, and have sent a protest to the dean and chapter against their adoption. It is contended that the plans disregard the first principles of ecclesiological church restoration. The naves and choirs of cathedrals ought, it is said, to be used simultaneously for divine service, the choirs being set apart for the clergy, and the naves for the general congregation, as is the case with the cathedrals of Ely, Lichfield, and Hereford.

SEMPRINGHAM ABBEY CHURCH.—This interesting old church has been restored and re-opened for Divine service. The old roof is replaced by a new one, and seats with bench ends carved in accordance with the existing originals have been substituted for the unsightly pews. The north wall has been rebuilt from its foundations, and extended so as to occupy the site of the old north transept. The walls have been denuded of their coloured washes, and the mural decorations brought to light. Three out of the four tower arches are now opened, and that on the south has had a new window inserted, which has been filled with stained glass. The chancel has been rebuilt by the Crown (her Majesty being the impropriator and owner of half the parish), at the cost of £400. It is in the Early English style.

BUILDINGS.

BARNSTAPLE.—New schools and a minister's house have been erected adjoining the Baptist Chapel, Boutport-street, for the use of children belonging to that denomination. The style is Domesticated Gothic, and the buildings have both a frontage flush with the street, and in continuation with the line of the side of the chapel. The materials employed externally are Newport bricks, and the dressings of Coombe Down stone. The label terminations are carved in the Naturalesque style of foliage, and with the other carved work is happily treated. There is an upper and a lower school-room, and the minister's house is large and well arranged. Messrs. Gould and Son, of Barnstaple, are the architects, and the work has all been done by local tradesmen, excepting the stone carving, which was executed by Mr. Harry Hems, of Exeter. The contractors were: Mr. Oatway, for woodwork; Mr. Garland, brickwork; and Mr. Gould, stonework.

FAVERSHAM.—The Ecclesiastical Commissioners have accepted the tender of Mr. Lewis Shrubsole, of Faversham, for the erection of new farm buildings and labourers' cottages at Elverton Farm, Faversham.

NEW TOWN HALL AND PAROCHIAL SCHOOLS, POPLAR.—Tenders have just been received by the trustees of the parish of All Saints', Poplar, for the erection of a new town hall and parochial Schools designed by Messrs. A. and C. Harston, architects. (See this week's "Trade News.") The premises, recently occupied as a town hall, form part of the workhouse, which the guardians previous to enlarging the house purchased of the trustees for the sum of £10,000. The new town hall is to be erected immediately opposite the parish church in Newby-place, on the site of the old watch house. To give greater area to this site it is found necessary to pull down the parochial schools, which are to be re-built on a more commodious plan adjoining the new town hall. The ground floor of the town hall building consists of board and committee rooms, clerks' and collectors' offices, &c. The main hall 70ft. by 40ft., is on the first floor, and has three separate approaches, viz., the principal staircase leading to the body of the hall, and two smaller staircases, one leading to the back of the hall and the gallery, and the other to the platform. The main staircase is approached from a large octagonal hall in the centre of the ground floor, immediately opposite the principal entrance. From this central hall lateral corridors of fire-proof construction give access to the various rooms and offices. The two minor staircases have direct access with the street. The style which has been adopted for the exterior is of an Italian character. The principal entrance has an intercolumniated vestibule with fluted piers, and red granite shafts with carved capitals. Above this vestibule is an open balcony, the arches forming which are supported on caryatides. The whole of this vestibule and balcony is constructed of Portland stone, the remainder of the front being faced with malm bricks with Portland stone, cornice pierced, ballustrading and finals, strings and window dressings, with granite shafts to the windows of the large hall.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

P. O. O's. to be made payable to J. Passmore Edwards, at the Strand Office. All cheques to be crossed on the Union Bank.

RECEIVED.—R. S.—Rev. D. B.—G. B.—C. B. S.—C. H. S.—J. N., Jun.—C. H. H.—J. V.—J. E.—J. C.—C. B. A.—W. H. L.—G. R. R.

J. N., JUN.—We cannot say when your sketch will appear.

JOINER.—1. Get the character if you can. 2. It would be nothing but fair that you should ask permission to take the photograph. 3. You ought not to think of compelling the foreman to give a character, as a character given under compulsion is not likely to be worth much.

E. P.—There is no annual exhibition of the Institute of British Architects. Write to the Secretary, 9, Conduit-street, W.

E. H. H.—Sketch of Exeter Cathedral received and returned.

ERRATA.—Mr. A. T. Walmisley writes:—In reading over the report of my paper on page 105 of your last number I find the following important misprints:—Line 21 from the bottom of, the first column ought to read "vertical piece of H iron into which the column;" line 9 from the bottom of the same column, the words "Such boarding" ought to be printed "*Inch* boarding;" top line of third column "H iron 10½in. deep" instead of "| iron."

Correspondence.

PLYMOUTH GUILDHALL COMPETITION.

(To the Editor of THE BUILDING NEWS.)

SIR,—On the point of what a referee "should stipulate to be," I may possibly agree with Mr. C. F. Hayward, and shall be glad if he will shortly submit his opinion to the profession generally through the medium of your correspondence column. On the question of "local influence," which he describes as being "more of a personal one, and is referable to facts," I regret to join issue. I have not seen any "printed statement," but allowing Mr. Hayward does "not know one of the Town Council," he is a very intimate friend of their professional adviser; and Mr. Hayward will hardly deny that his first introduction to Plymouth, as architect to the Duke of Cornwall Hotel, emanated from this quarter.

A reference to the reported account of the Council meeting held on the 13th October, 1869, will convince any person less intimate than myself with local tactics, that but for the unsolicited interposition of the said official, the order of merit

would have remained as Mr. Waterhouse decided —*vide Western Morning News*, 14th October, 1869—in which the Town Clerk is stated to have said "that the plan of 'Ich Dien' contained additional accommodation which could be reduced." An injustice being acknowledged, it is evident that Mr. Lynn is the sufferer therefrom, and the Council having since seen that a "mistake" had been committed, have endeavoured to amend it by making the 2nd and 3rd præmia of an equal money value.

As to the superior merits of Mr. Lynn's design, there cannot be a doubt; and the fact is further confirmed, inasmuch as it will, probably, from its simplicity of plan, form the nucleus for the proposed new arrangement on the "single block" system. Of the grandeur of the architecture there cannot be a question; and although Mr. Hayward's design is far preferable in every respect to that of "Fiat Justitia," I cannot agree with him that it was "the one most suitable for the purpose."

I must also differ from Mr. Hayward in the opinion expressed that he does not "pick a single hole in other designs." His remarks and comparisons, contained in a pamphlet sent through the Town Clerk, "for distribution to members of the corporation and others," while the choice of an architect was pending, disproves this statement, and the good taste of the course adopted is at least questionable, the more so as emanating from "A late Hon. Sec. of the Institute."

I cannot pretend to say what Mr. Waterhouse *undertook* to do; but his instructions were clear, and are appended:—

"To examine and report on the various plans, and the probable cost at which they can be erected; and that the selection of the designs to which premiums shall be awarded be postponed until the council are in possession of such report;" the Town Clerk further explaining in reply to Councillor Serpell, "that the gentleman the committee would employ would give them an opinion with reference to the whole 26 plans exhibited, together with separate estimates for the building of *each*, and then it would be for the committee to decide which they would adopt." Nothing could be more clearly defined, and Mr. Waterhouse "ought" to have followed the instructions, irrespective of whether "it was not then positively determined to build at all," or the reverse. Mr. Waterhouse does not assume the position of arbitrator, as the opening portion of his report demonstrates, viz., "I was favoured with your instructions to examine and report upon the designs, 25 in number, submitted in competition," yet, as departing from the assumption, further writes, "after a careful examination of the whole, I had *the pleasure* of explaining in an interview with you, (the committee) the merits of *eight* which appeared to me most worthy of the premiums you have offered, and I beg now to report on those eight in writing."

A good deal of what took place at this interview has come to my knowledge, and tends to prove that impartiality was not the order of the day; indeed, the "explanation" and the "interview" are two "ugly facts" that speak for themselves, and do not require further comment from yours truly, W. H. REID, Architect.

22, Courtenay-street, Plymouth,
Feb. 14, 1870.

REFEREES IN COMPETITION.

SIR,—In ascertaining what are "the proper functions of a referee,"—and "in the absence of any special ruling of the Institute"—there is no objection to any one stating their views, or indeed any views not their own, with a view to bringing out the points of the question distinctly, and of forming a sort of professional public opinion upon them. In this way I am writing to put forward a few notions which I do not claim all as my own, but as being held variously in various ways, and as leading thoughtful men to see that there are two sides even of a professional question. Mr. Lynn (BUILDING NEWS, No. 786) has definitely put forward his view, that the office of referee should not be accepted on any other understanding than that of arbitrator between the competitors and the promoters, and this without even limiting the office to architects or any connected with the profession. But this involves the necessity of knowing beforehand who the arbitrator is to be, and of the competitors agreeing to such arbitrator. For instance, if a committee instituting a competition for a church, state that they will themselves decide on the best plan for their purposes, and not call in any professional assistance, unless under certain circumstances, then they become arbitrators themselves, and are tacitly admitted as such by the competitors sending in their drawings. If they call in an architect to advise them, and he does advise on a number of drawings, and even if he picks out a certain few for pre-eminence, he does not thereby become arbitrator, nor can the committee shuffle off the responsibility from their own shoulders on to his. Again, it is doubtful if such a committee should actually appoint an architect not to advise only, but purposely to arbitrate and decide, without appeal, as to designs—whether that would relieve them from the necessity of formally adopting the report of their 'arbitrator,' and so taking upon themselves the responsibility of his decision.

Now, it is quite as important to members of the profession that their relations to committees should be clear and exact, and that the feeling of responsibility in committees should be developed rather than checked, as that professional advice should be sought and obtained to decide competitions.

No one can be more desirous of this than myself; and no one would be more ready than I am to uphold the decision of an 'arbitrator' properly constituted; but it is important to define what the proper functions of a "referee" are, and not to confound them with, or to assume they are the same as those of an "arbitrator."

No committee or council would be willing, I believe, to give up their functions and their power of accepting or declining to ratify the report of any professional man they might refer to. Nor, indeed, would it be altogether desirable that they should. They have to find the money, as well as to bear the responsibility of carrying out the works; and to say they shall not or cannot take any part, or form any judgment upon designs, is going too far. Our object should be to popularise our art; to make it interesting; to call out opinions to induce the public to criticise justly and fairly our works; not to shut ourselves up as a mysterious profession carrying out ideas too profound to be generally understood, and too abstruse to be comprehensible. The fault in general criticism on architecture, and the absurd judgments often given at the present day, are too much the result of such arbitrary ways, and it is enough to take any client's heart out of his work when he is put down by his architect as an ignorant pretender who has only to pay, and admire, instead of an intelligent employer, and open-hearted friend, delighting in the work produced and rejoicing in being able to understand and appreciate as well as to find the means for carrying on the works.

Doubtless clients are apt to be "cantankerous;" to desire too much to control the last easy details, and so to spoil works, all the rest of which are placed under the architect's sole control. Yet is not this sometimes the result of too inconsiderate claims, and the too arbitrary manner of the architect himself?

Similarly, perhaps (for I am only stating the case), the attempt to urge committees too far would be fatal, and while on the one hand it is of the utmost importance for architects to urge the practice of calling in professional advice, as a matter of course in all competitions, and to uphold it as far as possible when so obtained, it might entirely prevent this being carried out, to insist that such advice should be final and conclusive, and that the committee or council should have no further power, choice, or responsibility after the architectural referee had been called in; and, in fact, that the committee should delegate their authority to the profession to which they appeal for designs.

Many cases have occurred in which errors have been discovered, or at least faults found—real, not imaginary, faults—with the decisions of the most eminent men. These could be, and have been rectified by the body adopting or rejecting, that is the responsible body; but in the case of an arbitrator, faults are not recognisable. Again, can it be said that a body of men are willing to be dumb under the imputation of any non-existent faults, simply because some one, however eminent, and who has been brought into the case without their knowledge or consent, is a member of their own profession, and deservedly holds one of the highest places?

Infallibility does not belong to architects as arbitrators any more than as designers; and it might be all very well to make the rule, but it might not bear the strain of the first application.

There is no reason why some such rules as are implied in the following queries might not become the practice, and ultimately the law of the profession. Should not an architect be called in to frame the clauses of the conditions of competition or instructions to competitors? Should not this same gentleman act as referee, and award the premiums, or the execution of the building or work, as the case may be? Should not this gentleman's name be made known with the terms of the competition, and his functions be stated therein? Should not his award (together with the reasons for making the same) be published as soon as made? Should time or opportunity be left for the correction of any error or errors before the award is adopted by the authorities instituting the competition?—I am, Sir, yours, &c.,

C. F. HAYWARD.

PROTESTANTISM AND ITS CHURCHES.

SIR,—The remarks in your leading article of last week ably represented the two varieties of the type of church building generally adopted in this country, namely—the nave and aisles arrangement, or the mediæval development of the Roman basilica, and the impoverished adaptation of it to Nonconformist uses. Both are manifestly irrational and unsuited to our modern idea of religious worship, inasmuch as they are more or less derived from mediæval requirements and usages, and yet it is strange our leading church architects still adhere in spirit and letter to the old type in spite of its evident unfitness to the conditions of common-sense requirements—viz., an unobstructed space for hearing and seeing, convenience, and acoustical considerations.

To shake off, however, the association of custom is a hard task, and it seems to me our architects must first disengage their minds of mediæval conceptions, and disenthral their feelings from those associations which at present exercise such a marked influence over their tastes. It is little use in showing the unfitness of a type of building for modern purposes, if these purposes are not accepted, or imperfectly understood as the primal source. The education of the mind and taste in mediæval antiquities and arts so lavishly displayed in recent works and in ritualistic practices, has been a considerable drawback to any advanced or rational improvement in church arrangements; but directly this tendency to mediæval sentimentalism is overcome we may expect to find our architects entering into a more intelligible comprehension of the wants and architectural character suited to modern Christian worship. The Nonconformist's type does not meet our needs, indeed, often falls short of that æsthetic realisation or embodiment of our requirements which it should be the aim of church architecture to accomplish. The slenderness and wiriness of the architectural features, amounting often to a flimsiness of construction, is too painfully apparent to warrant any reason for their intrusion or existence at all, except as a pitiable dilution, an apeing at effect of features worthless when so transmuted. Such a desire to mimic (by a wrong process) the semblance of church architecture must prove futile in its results. We want a more intellectual mode of design.

In the church planning of the Establishment, much the same desire impedes any thoughtful working out or solution of the problem, viz.—What is the intelligible plan and expression of a church to meet our modern wants? I have before laid down the conditions—An area as unbroken as possible, in which all may see and hear; and a dignified expression. One embodiment of this seems to me to be an arrangement in which the aisles are reduced to the width of side passages, thus concentrating the worshippers within the central and unobstructed area. Such a plan retains the three avenues, assists the roof construction, and architectural effect. A second plan is that based on the square or short rectangle, and admitting four or eight piers supporting a domical roof, instead of the basilican ranges of pillars. A third variety may be founded on circular or polygonal forms.

In another letter I may have something further to say, but every reader of THE BUILDING NEWS must thank you for the series of valuable papers and examples you have lately given suggestive of a *congregational* development of church architecture, all past and present efforts being more or less founded on the sacrificial temple type.—I am, sir, yours, &c., G. HUSKISSON GUILLAUME.

ARCHITECTURE IN MANCHESTER.

SIR,—"A. R." is a wag. He thinks "it may be useful" for me to know that the 'real or sham masonry" parapet of

Salford bridge is made of "cast iron"! Let us hope it is at least only a hollow "sham." The parapet has a heavy moulded dado, whose stone-like pedestals, base, and cornice are, I daresay, as much as 10in. thick. It is cast in short lengths, cross-jointed like "masonry," and lies all across the river, a dead weight upon the *straight* iron girders, that, judging from their oscillation, would perhaps be all the better for some of the surplus metal in the parapet.—Yours, &c.,
W. Y.

SIR,—"A. R." does not see the point of "W. Y.'s" remarks. Salford Bridge has "a very massive parapet," and although of iron it does pretend to be masonry. "W. Y.'s" whole article is a very fair one, although he evidently fears to "slog" our local architect as fearlessly as he ought to do. "W. Y." has not told you that, with perhaps two exceptions, all Mr. Medland Taylor's churches are internally plaster ones, arches, ornaments, labels, &c. "W. Y." has also omitted to state that the whole of the interior of the cathedral has been restored by cutting away all the stonework, and replacing it with plaster. With the exception of the tower, and that is veneered with Bath stone, the whole of the interior, literally every inch, is plaster. The original stone was red sandstone, and the effect must have been very warm and pleasant. Now, the wretched building looks as though it were permanently sick.

Will you, Mr. Editor, let us Cottonopolites know what you think of plaster cathedrals and churches?—I remain, yours, &c.,
PLASTER OF PARIS.

P.S.—Up to May 31st, 1869, £30,000 had been expended on the cathedral!

FURNITURE AND DECORATION.

SIR,—I can't, for the life of me, understand what your correspondent "H. B." is aiming at in his strictures on the article entitled, "The Theory and Practice of House Painting," &c. His sneer in regard to a workman's point of view falls harmless. It will be evident to anyone who will take the trouble to refer to the article named, that "H. B." has taken a sentence, and without regarding the context, has formed a theory of his own totally unwarranted by the general bearing of the text, and so lame in its conclusion that it is scarce worthy of a reply. "H. B." is equally unfortunate in his endeavours to show that Nature makes mistakes in colouring. He says a piece of sea coast, with a precipitous slope covered with vegetation rising from the beach forms a perfectly harmonious combination of colour (note the slippery illustration which follows); presently the *slopes slides* into the sea, and in place of the green we have a red cliff. (I should like to know how much of the cliff was left after the slope had slid, as the writer elegantly expresses it, or whether our would-be-critic was an eye-witness of this tremendous avalanche? He then goes on to say this change cannot be immaterial. Well; no, I quite agree with him, for it is very probable that the red cliff would harmonise better with its surroundings than the green cliff did previous to the sad catastrophe. Again, "H. B." asks, do I mean that purity, simplicity, and adaptation, should be avoided? No, I do not, and I defy any mind except, perhaps, one of the same stamp as Corney Delaney's (crass Corney) to find one line throughout the article tending to that end. Seriously, it is evident throughout the whole of "H. B.'s" letter that he is nettled at my criticism of the work of the firm of upholsterers and decorators referred to in the text. Possibly he may be a member of the firm, and is troubled with a tender conscience, although one would scarcely think so from the misrepresentation of facts in his letter. In reference to the above he represents me to say that there could be no fault found with the work as a whole. Look again, "H. B.", and you will find that the text says, no fault to be found with the "execution" of the work, and if "H. B." does not know that work may be well executed, and yet be deficient in good taste, he has yet much to learn. AN EXPERIENCED WORKMAN.

THE VILLA IN S. JAMES' PARK.

SIR,—It is evident by his letter that the mild forbearance shown in your excellent criticism on this villa is not appreciated by Mr. MacDougall, the owner. On the contrary, he seems to rejoice in the marvellous production of the original-minded gentleman who, he delights to inform us, is "City Architect of Bath," to his mind, no doubt, a recommendation, and *it is*, perhaps, somewhat satisfactory to know that we are not indebted to a London architect for this effusion.

This matter, however, introduces us to the important fact that in London, and even on such a site as this villa occupies, it is possible for an architect with funds at his disposal to favour us with any "fancy" design, however vulgar, he may choose to put up. The submission of the drawings to the Office of Woods (as probably occurred in this instance—the villa being on Crown property) is not sufficient; what is wanted (and it has been often advocated in THE BUILDING NEWS is a department of acknowledged ability, where not only all designs for important works are to be submitted and approved, but such designs followed out in their detail, and also a specification deposited which shall not only describe the materials to be used, but set forth the colours, if any, that are proposed to adorn the structure. The adoption of this system would probably prevent a repetition of such vulgarity as is displayed in this villa; but such a desideratum is, however, I fear, not to be expected when a gentleman with the artistic notions of Mr. Ayrton is First Commissioner of Works.

I cannot conclude before congratulating the Corporation of Bath on the possession of an architect with such original and elegant taste as that possessed by Mr. Davis, and Mr. Davis on becoming acquainted with a client, equal, perhaps, to himself in that respect, and I only hope that in the event of Mr. MacDougall having more money to spend on speculation houses, he will, with his architect, "go to Bath," and not add another to the already too many architectural curiosities of London.—I am, yours, &c.,
W. W.

"A. Y.," another correspondent, says:—"I watched with remarkable curiosity this architectural abortion rising gradually from the ground, which it encumbers in all its ugliness, marvelling much as it grew towards completion with what crowning absurdity it would be capped. Having risen to the height of the Brobdignagian egg and tongue moulding, all the bold ideas of its designer seem to have taken flight, and, as a necessary consequence, a collapse was the result. He appears then, to have been in a great hurry to cover it in, as though he had all at once awakened to a sense of his imperfections. The near neighbourhood of what Mr. McDougall styles Mr. Scott's 'monster building' with this villa, reminds one of Landseer's celebrated picture of 'Dignity and Impudence.' The massive and quiet dignity of the Foreign Offices make more apparent the apish pretentiousness of this so-called elegant villa.' What's in a name?"

DEPRESSION IN TRADE.

SIR,—I would suggest as a remedy for the great depression in the building and most other trades, the following:—That the trades' unions be of some real benefit to themselves and the country, by agitating for the cultivation of waste lands away from large towns at home, and for an emigration scheme, on a large scale, by the Government finding the means.

Money can be found for such purposes as the Russian war, to the amount of one hundred million pounds; and why cannot a few millions be found for the benefit of the poor, which probably would be returned by a well-considered scheme?

I understand Mr. Gladstone has refused all Government aid to emigration, and which probably every person in his position would do without there first being some great public manifestation of opinion.

I should be sorry to see the best workmen leave this country, but the duty of all plainly is, to seek work abroad if it cannot be found at home.

Some work would at once be obtained by architects, builders, and workmen, if the waste and reclamation land project were at once started, and trade generally would be benefited. One person I know did not earn a shilling for five months preceding the panic, and very little since that time, now four years, although he had plenty of work previously; and how many besides him have been plodding along with the hope that business would next year be better?

My surprise has been at the workmen having borne their privations with such fortitude, which I think all must admire. But this state of things must not be expected to continue.—I remain, yours, &c.,
JOHN EDWARD ORMES.

Intercommunication.

QUESTIONS.

[1772.]—CIVIL ENGINEER'S PUPIL.—Will any of your numerous correspondents inform me as to the duties and requisements of a civil engineer's pupil, also what advantages he may reasonably expect to further the prosecution of his studies in return for a liberal premium paid?—A CIVIL ENGINEER'S PUPIL.

[1773.]—BELL FOR COUNTRY CHURCH.—I have been requested to ascertain the size, cost, &c., of a bell for a country church, and will be obliged by any of your correspondents answering the following queries, viz.:—1. It is desirable that the bell should be heard over a radius of about 2½ miles; the belfry of church is about as high as any part of the parish where it is required to be heard; what size of a bell would be necessary for this? Its weight and diameter over mouth? 2. It is wished to have the bell rung by lever, as it is to be in a belfry on gable of church and rung from the outside. How is this done? Give a sketch. The belfry is square on plan. 3. What should be the cost of such a bell per cwt., or with lever ringing fittings? 4. Give the addresses of one or two of the best bellfounders? 5. What are the strongest and best toned bells cast of? 6. As the belfry piers are not strong enough to hang the bell on, it is proposed to hang it between two supports bolted to the sill stone; what should these supports be made of to affect as little as possible the tone of the bell?—D. P. C.

[1774.]—CIRCULAR RAINWATER TANK.—I am excavating for a circular rainwater tank, 12ft. 4in. diameter, and 30ft. deep. Failing to find any given rule in my books for ascertaining its true cubical contents, I appeal to your numerous correspondents to assist me in solving my difficulty.—SANDYSARMS.

[1775.]—IRON ROOFS.—In what work can I see some good specifications for iron roofs?—W. T.

[1776.]—CEMENT WITH MORTAR.—I should be glad to know if the practice of using cement in conjunction with mortar is injurious, in the erection of half-brick walls for instance? I have been informed that the one destroys the other. Is this so?—W. H. S.

[1777.]—THE CHURCH BUILDING SOCIETY AND AMBULATORY CHURCHES.—We wish to ascertain if the Church Building Society have a rule or regulation by which they refuse to make a grant towards the erection of an ambulatory church, that is, an arrangement of plan by which the congregation is seated in a building roofed in one span without columns and having a full view of the clergyman and choir, with a centre passage to a cloister-like walk round, giving access to the seats. We have prepared a design founded upon this principle of arrangement, and are informed by the committee that the plan must consist of the old regulation nave and aisles, otherwise the committee would lose the grant from the Church Building Society; and although our ambulatory design is much approved and perfectly satisfactory to the committee, yet they are compelled to decline it upon that ground alone. We can scarcely believe that the society would put so decided a veto upon an attempt to adapt a church building to the requirements of modern church congregational purposes, especially if the architectural treatment is not at variance with sound Gothic feeling, which we venture to say is the case with our design.—W. D. and M.

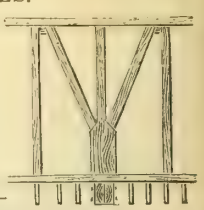
[1778.]—CIVIL ENGINEER.—What must be done in order to honourably and rightly use the letters C. E. at the end of a person's name? Is there an examination, and of what nature; or is it to be obtained by mere money payment, or how is it to be obtained? If one of your correspondents would kindly oblige with particulars, it would confer a great favour.—ASPIRANT C.E.

[1779.]—UNANSWERED QUERY.—I asked through THE BUILDING NEWS "Intercommunication" column of December 31st if any of the readers of THE BUILDING NEWS would assist me in getting the "lines" for constructing what is commonly called "an arch upon circle," and as there has been no reply I repeat the request, and any one that can and will give me any information on the subject will truly oblige.—YOUNG STONEMASON.

[1780.]—MATERIAL FOR BALCONET.—I wish to place a 3″ sill in front of a dining room window on which to place flowers. There must be a protection for them from falling in the shape of a balconet. Will any of your readers kindly recommend the best kind of stone that can be used, excluding York, whether wrought or cast iron should be used in the balconet, and how the latter may be securely fixed?—AB INITIO.

REPLIES.

[1769.]—FRAMING OF PARTITIONS.—I quite agree with "Foreman's" plan for the carrying of a roof principal. I have given a rough sketch, suggesting a slight alteration to plan No. 1, and instead of using a wrought angle iron girder would recommend a wood girder with an iron flitch.—C. W.—R. E. D.



[1770.]—FRAMING OF PARTITIONS.—Fig. 2 is decidedly the best method. The uprights being relied on to carry the weight, the crosspieces to keep the centre upright, which has the most pressure on it, from going to left or right. What use would the crosspieces in Fig. 1 be if there were a strain on the outside uprights, seeing they are standing on sharp points which must crush with a very little weight on them? The three uprights by themselves would be more trustworthy than if accompanied with trusses put in as those in Fig. 1, for they tend to thrust out the top, and should any pressure come on them of any amount, they are sure to give way and break at the bottom. Suppose the uprights over joists to give way in Fig. 1, and down comes the whole concern, because standing on a point as it were, but should the same happen in Fig. 2, it cannot be quite so bad, as the centre upright, being well supported, would stand much longer. The idea of throwing all the weight on the iron girder may be a good one, if that has been allowed for in the girder itself, but the style of doing it as shown in Fig. 1 is weak and dangerous. Get squarer ends to your crosspieces by putting their inside face in the bottom angle, and they may be a little good, although then I would rather see them reversed, as in Fig. 2, and for the weight, trust to the uprights, seeing A, or as I suppose, the principal, is nearer the centre upright than the others.—CHIP.

Our Office Table.

REPORTED RESIGNATION OF MR. BARRY.—Mr. Ayrton, the new First Commissioner of Works, and Mr. Barry, the architect of the Houses of Parliament, are said to have quarrelled. Some unpleasantness about expenditure and necessary improvements are stated to have arisen, with the result that Mr. Barry has resigned his position. The *Echo* says Mr. Ayrton has informed Mr. Barry that in consequence of the new arrangements made for the conduct of the business of the Board of Works, the Houses of Parliament will be placed under the care of the officers of the department, and the estimates for works be prepared by them.

ORGANS.—A correspondent (Mr. W. H. Stone) writes:—"May I suggest to "C.B.A.," who sends you a long letter upon the Haarlem and York organs, that he is rather behind the age. The former organ has long ceased to be any wonder, either for size or variety of stops. It is surpassed by most good parish organs, even if it were in good order, which I believe it is not. The York organ of which he speaks, like its creator, Dr. Camidge, has ceased to exist, and is replaced by a far finer instrument. The old pannelled 32ft. wood stop is replaced by one which really speaks, instead of rumbling, and reinforced by a 32ft. in metal. The present organist, my friend Dr. Monk, is even a greater advance on the former than his organ."

NEW HOUSE PATENT.—Mrs. Irwin, a sister of Mrs. Stonewall Jackson, has, it is said, secured a patent for an improvement in the construction of houses, which, it is claimed, will create a new era in architecture. Mrs. Irwin proposes six-walled or hexagonal apartments, which are not only much handsomer, but really cheaper than the quadrangular form. A wall of 80 feet built in the hexagonal form encloses a third more space than the same length of wall built in the square form, and as these hexagonal rooms fit into each other without loss of space, the gain in the whole building is very great. The patentee also claims that this mode of building gives a greater degree of strength than any other, and that this mode of building, in the hands of a good architect, is capable of assuming greater artistic beauty than the square or quadrangular form. The octagonal building attracted a good deal of attention some years ago, but the hexagonal is claimed to be something entirely new.

THE NEW GREEN BANK CEMETERY, BRISTOL.—The site of the proposed new Green Bank Cemetery, Stapleton-road, is now in the hands of the contractor, Mr. Wm. Brock, of Temple Meads. The works were commenced on Monday last. The tenders for the works sent in by fifteen firms ranged from £4662 to £6143. The works have been designed by, and will be carried out under the direction of, Mr. Henry Masters, architect and surveyor, of Park Street, Bristol, and are expected to be completed by the end of this year.

THE BUILDING NEWS.

LONDON, FRIDAY, FEBRUARY 25, 1870.

TREDGOLD'S ELEMENTARY PRINCIPLES OF CARPENTRY; WITH APPENDIX BY PETER BARLOW, F.R.S.*

WHILE we give ourselves infinite trouble, says the *Edinburgh Review*, to pursue investigations relating to the motions and masses of bodies which move at immeasurable distances from our planet, we have never thought of determining the forces necessary to prevent the roofs of our houses from falling on our heads. The portrait of Tredgold has the lineaments of one in whose mind we might well imagine this very question to be deeply revolving. It bespeaks the inquirer, observer, experimentist, and reasoner, whose active mind seems to permeate and vivify the haggard features of the man. It was indeed no common mind from which teemed in rapid succeesion works on the strength of cast iron, railroads and carriages, the steam engine, warming and ventilating, and the principles of carpentry. Appreciated by his scientific contemporaries, Tredgold was raised to the status of honorary member of the institution of Civil Engineers, and being requested by the Council to define the objects of their foundation, he produced a statement that may be traced in the charter subsequently granted to the body. It was reproduced by Mr. Gregory in his presidential address two years ago, as interesting to every engineer from its authorship, and from its bearing on the history of the Institution. Some of his works may have given way to more recent productions, extended research, or the further revelation of facts, but his principles of carpentry are rather confirmed than impaired by time, and, as now presented, combine the surest base with the most interesting display of progressive science.

Previous to Tredgold's investigations, carpentry had been the subject of many essays, and those of Peter Nicholson had nearly reached the ultimate limits in certain directions; but except a few formulæ on the strength of timber, and these frequently erroneous, the engineering department of the art presented a novel and untrodden field. One indeed that had been singularly neglected, and the more strangely as the mechanic principles applicable to carpentry are essential to construction in general and scarcely less so to architectural design. An architect ignorant of construction is not merely on a par with a sculptor ignorant of anatomy; he is as deficient in the groundwork of his vocation as the surgeon who knows nothing of the skeleton. Unless the properties of materials and the forces to which they are subject be clearly perceived, it is vain to expect effective and masterly works. This substitution of certainty for uncertainty, security for insecurity, is the true purpose of science. The engineer contrasts material and strength, the architect has the higher aim of uniting strength with beauty; but he is both engineer and architect who combines in visible accordance, stability, economy and grace.

Though dealing with a subject susceptible of a highly mathematical treatment, Tredgold preferred a simple method adapted to ordinary use, and the current needs of business men. That his choice was judicious is attested by the high estimation and unprecedented success his labours have attained.

The present is the fifth, a corrected and enlarged edition, with Mr. Barlow's appendix of various ancient and modern roofs. The letterpress extends to 336 pp., and besides occasional woodcuts, the original number of twenty-two engravings is augmented to sixty-four. The additional plates are of great intrinsic value, and we will not object that some of them relate less to timber than iron; very few are of the latter exclusively, and where the two are jointly employed, the illustrations must be appropriate and welcome, enhancing, as the publishers have correctly anticipated, the worth and usefulness of the book.

The treatise is divided, for the sake of perspicuity, into about a dozen heads or sections, so that the reader is conducted by well-defined steps from stage to stage, and the process of reference is shortened and simplified. But while the coupling of paragraphs and engraved figures gives direct correspondence and makes comparison of text and illustration agreeable and easy in an original edition, it becomes an impediment to the expanding interpolations on which after issues depend for progressive vigour. To such a cause we ascribe the postponement to a late part of the book of an important essay on the nature and properties of timber, since it would obviously be consistent with correct method to view the material in its physiological aspects, and open a definite acquaintance with its qualities and powers, before indicating its constructive fitness and application. But to take the contents *seriatim*.

The knowledge primarily requisite in designing frames of timber being a just notion of the action of forces, the author devotes his first section to an elaborate exposition of the conditions affecting the equilibrium and pressure of beams. Starting with the simple postulate that a heavy body exerts a vertical power equal to its weight, and would descend in a vertical line, if not prevented by some other power, he proceeds to discuss the composition and resolution of forces, and applies the principles to framed trusses and levers. Ties and struts are distinguished, the centre of gravity and curve of equilibrium are determined, the strain on beams and the stress occasioned by fluids, as on the gates of canal locks, are exhibited. This part has thirty-seven engraved diagrams. The next chapter treats of resistance to strains, as tension, cross strains, and compression. It displays the respective powers of various woods in point of cohesion, stiffness, strength, and resistance; and it is only by an acquaintance with these powers that the dimensions or scantling of a piece of timber capable of sustaining a given weight or pressure, can be rightly determined. Beams, columns, cantilevers, and the parts of framing are thus proportioned in accordance with numerous and exact experiments, the results of which are given, and the rules for application carefully explained.

The third section is devoted to the construction of floors, or, technically, naked flooring. There are three kinds—viz., single joisted, double floors, and framed floors. They constitute a department of universal occurrence, in which large quantities of material are consumed, in which failure is more than anywhere disastrous, and where judicious and economic disposition is of the utmost advantage. We learn that "single joisting makes a much stronger floor, with the same quantity of timber, than a double or framed floor, and may be constructed with equal ease to the same extent of bearing; but the ceilings are more subject to cracks and irregularities; consequently single joisted floors of long bearings can only be used in inferior buildings." The superior strength of single joists was shown by a simple experiment of Professor Robison. Two models, 18in. square, were made from equal quantities of timber. One consisted of single joists and the other was framed of girders, binding-joists, bridging, and ceiling joists. They were placed in a trunk and supported at the edges. The single floor broke with 487lb., the framed floor with 327lb., so that the first was about once and a half as strong as the second. Circumstances will, however, make the use of each imperative from time to time. The best modes of their formation are described and illustrated, each kind of joist and girder being separately discussed, and the constants for determining scantlings supplied.

That a great waste of material ensues from the provisions necessary to insure a sound and perfect ceiling under extensive floors, the author and editor are agreed upon. The latter calls it a "mask which modern fashions render imperative." Now apart from the material, the fashions are of very respectable standing, not to say antiquity, since they date at least from the time of the Tudors. The ceiling at the top of a room is no more a "mask" than the lining at the sides, whether of tapestry or arras, baudekyn, wainscoting, or plaster, and it is surely a sweeping censure to say that modern building contrivances in general are "exacted to satisfy fashions and conventional respectabilities." An engineer may concern himself with the necessities of construction alone—refinements and embellishments are not his care, but neither is it, we are constrained to suggest, his legitimate business to disparage them. Science is good, but Art is not therefore superfluous.

Section 4, treats of the construction of roofs, and no part of a house affords a better opportunity for skilful carpentry. Roofs have been commonly made too heavy. It was but natural that designers, uncertain of the behaviour of their material, should be careful to err on the side of safety; if indeed security can be aided by converting that into a load which is intended for a support. In calculating the strength of an iron frame, its own weight is always taken into account, and the principle, though not the practice, has proportionate operation in woodwork. To show how a roof could be made with the smallest quantity of timber was a valuable service, relieving the walls of a needless load and the owner from a wasteful expense. A memorable instance of this nature occurred when the roof of S. Paul's Church, Covent-garden, designed by Inigo Jones, was restored by Thomas Hardwick. But it was left for Tredgold to investigate and demonstrate the proper form and power of every part.

In an exposition of elementary principles it was unnecessary, and even undesirable, to meddle with the complicated forms of mediæval roofs. The author therefore dismisses them with a few brief but careful and accurate remarks:—"Their principles of construction bear," he says, "a nearer analogy to masonry than to modern carpentry. The fashion of timber-framed roofs originated about the time of Edward III., as applied to great halls. They became common about 1400, and spans of considerable extent were roofed in a most judicious manner." But here, unfortunately, the editor steps forward to refute his author. "In England all judicious timber-roofing ceased," he tells us "in buildings of pretension, about 1400, and gave place to the extravaganzas above alluded to, of which Westminster Hall (1395) was the first and largest in scale." Thus the one roof of which above all others England has had cause to be proud, the one that has enjoyed the most universal celebrity, whose design exhibits the applied conditions of equilibrium and stability, is classed with debased conceits and extravaganzas! The calm reason and manifest good sense that so agreeably pervade the writings of Tredgold would have made him too dignified to contemn what he did not understand, but the editor (to whose eminent qualifications it is needless to express the most cheerful testimony), instead of leaving his want of acquaintance with this particular matter to be inferred, insists upon writing it down. Such a conflict of opinion between author and editor would in any case be injurious and disfiguring; but when uncalled for

*Elementary Principles of Carpentry, with Practical Rules and Examples. An Essay on the Nature and Properties of Timber, and Numerous Tables. By THOMAS TREDGOLD, Civil Engineer. Fifth edition. With an Appendix by PETER BARLOW, F.R.S., &c. London: Lockwood, and Co., 1870.

and capricious, constitutes a blemish that would be well removed.

Let us, however, continue the examination of this interesting chapter, in which suitable forms of trusses for different spans are given, and rules for proportioning the respective timbers explained. Then follow a series of executed examples, drawn from some of the most notable buildings of Rome, Florence, Modena, Moscow, and many English instances of recent construction. Several of these illustrate the combination of wood and iron, and indeed of the ascendancy which the latter material is acquiring in works of chief importance. The engine-house of the Abbey Mills Pumping Station, for the Metropolitan Drainage, has the peculiarity of a curb or mansard roof. Mr. Sydney Smirke, Mr. Shaw, Mr. Lewis Cubitt, and Mr. Brunel are among the eminent contributors.

After a short treatise on the construction of domes and partitions, we come to centres for bridges. Here the angle of repose, the increasing pressure as the arch stones approach the middle, and other points, are explained, and some of the best authorities referred to in connection with the engraved illustrations.

From this natural prelude, the subject of bridges proper is arrived at, and commenced by a slight historical sketch of such structures, from the Bridge of Sublicius, 500 years B.C., to the most approved instances of recent date. Among the steps to modern practice are the improvements of Palladio, Price, and Wiebeking the latter of whom erected the bridge of Bamberg over the Regritz, with curved ribs and a span of 208ft., the greatest at the time (1809) in Europe. The circumstances that ought to guide the design of modern bridges are carefully set forth, and the proper scantlings determined.

Very serviceable information is given on scarfing, joints, straps and shoes. It is of consequence to know the best mode of lengthening timbers to resist particular strains as pulling, compressing, or tearing across—of combining several timbers into a single beam—of so forming joints as to throw pressure into the axes of the pieces, and of applying iron shoes, straps, &c. In this chapter all these particulars are fully elucidated.

Lastly, and, as we think, unduly late, comes the treatise on the nature and properties of timber. The formation and growth, the maturity, and the season for felling, are first stated. Processes of seasoning and artificial preparation are treated of. The causes of decay are shown, and the means of prevention pointed out. The action of the weather, the ravages of worms and insects are brought under notice, and upon the durability of timber, conclusive evidence is adduced.

A sub-section goes into the classification of woods as to cohesive force, elasticity, permanent alteration of structure, hardness, toughness, &c., affording a comparative view of many English and foreign species, whose applicabiliy to special purposes may thus be seen. There are three-and-twenty tables of scantlings, specific gravities and useful data, with an index connecting the great mass of information contained in a work whose monumental excellence must commend it wherever skilful carpentry is concerned.

MODERN STAINED GLASS IN GLASGOW CATHEDRAL.

IF Westminster Abbey has been victimised by the experiments in stained glass inserted into it of late years, the very noble, and not far inferior, pile of Glasgow Cathedral has had its interior utterly ruined by the same agency. Still, though the agency has been the same, the two cases widely differ. Westminster, barring its clerestory, has suffered from the plague which has inflicted almost all our cathedrals and larger churches—that of being turned into an experimental museum for various manufacturers—seldom can we say artists—to try their 'prentice hands upon; whereas Glasgow has nought to complain of that kind, unities have not in its case been disturbed, but simply overwhelmed instead, and a very flood, harmonious in its volume of discordance, has been poured out upon it. In Westminster, as in most instances, next to windows which seem to have been formed, as a salad often is, of ingredients chopped so small that even the potent onion may lurk in it undiscovered, come others with medallions with quiet *grissaile* for their groundwork, or canopies with life-sized figures under them for a change. But in Glasgow the whole building has been delivered up to the fell swoop of one bad school which has wrought its will upon it with a vengeance throughout.

It is true that Glasgow, never bright, was duller perhaps than usual during a short visit that I was enabled recently to pay to it. But the fog outside was white as the snows which usually alternate with the rain in that northern clime, but inside of the Cathedral it was of the yellow pea-soup hue occasionally familiar to Londoners in November, so that the general effect of what would be otherwise a fine interior was quite spoilt. I certainly expected little of the glass at Glasgow, although Mr. Winston had stood sponsor for it, but I found less. It is true that here and there were pictures which looked as if they might perhaps have been good if the light did not shine through them, but considered as clever, though mistaken, transparencies, their appearance with their surroundings was most grotesque. Fancy a painting well drawn and soberly tinted, as some of them were, set in a border of a zig-zag pattern in quiet colours, such as strong red and yellow, under a canopy of hideous pseudo-Gothic work standing out from a background above of the rawest scarlet and blue alternately, and beneath an equally gaudily-coloured combination of shields and other heraldic accompaniments. Fancy an elaborately-designed representation of the "Prodigal Son," with attendant pig drawn and shaded to the life, but with, unfortunately, the leadwork necessary to enclose it starting off at a tangent from its nose, making it look as if smoking a cigar; while in the next compartment the reprobate in question is rushing into the arms of his parent, who is dressed out in a parti-coloured garb of azure and ruby, the scene apparently viewed through the window of the Lord Mayor's coach. This is but a sample of the comical effects which are set around the choir to compete, as they must, for the attention of the congregation with the eloquence of the divine preaching from the pulpit in the midst. It was simply astounding to me that the good citizens of Glasgow should ever have been advised to adopt this—the Munich style of painted glass; or, having been so advised, should continue to spend thousands of pounds in completing a series which is crude in colour and ridiculous in treatment. Eels, they say, become used to being skinned, and the verger assured me that the inhabitants really admired these windows. People seem to look at glass painting, or, rather, half-look at them, as if they were not meant to be examined closely, and I very much question if some of them were fixed upside down whether many would notice that anything was wrong. Possibly this arises in some measure from the fact that they have had but few opportunities of seeing high artistic work appropriately treated according to the material—they imagine that the technicalities of the work are beyond them, and that all that is sought for should be bright and broken colours to flicker over the stonework within and dazzle their eyes.

In other matters it appeared to me that Glasgow did not lag so far behind. Near, and beyond the Cathedral is a stately new church tower and spire, to surpass which it would be difficult to find an example in our metropolis, and generally the new churches seemed built with commendable simplicity and boldness. The internal quadrangles of the old college, not far off, are very interesting, with their circular-stair turrets projecting from the several sides; and the view from the top of the hill upon which the Cathedral stands is eminently picturesque, with a line of bold and striking monuments crowning the crest of the hill beyond and standing up high against the sky. Few of our cemeteries could present anything comparable to the effect thus produced. JOHN P. SEDDON.

ART WORKMANSHIP COMPETITION AT THE SOCIETY OF ARTS.—1869-70.

[SECOND NOTICE.]

THE Second Division comprises specimens of the application to ordinary industry of prescribed art processes. Before, however, we proceed to its consideration, we would repair an omission in our last notice as to No. 15, Class 5B, First Division, for having discovered this work, executed after a missal cover in the South Kensington Museum, we ought to express our high admiration of this admirable copy of an excellent work.

Class A.—Nos. 39, 40, and 41 are specimens of clock dials, enamel painted; the first and last in colours and gold, the second with white ground and black ornament. The last, by Mr. C. W. Pf nder, is the most effective, and is soft and harmonious in effect, and the ornament is well designed. The decoration in No. 40 is poor and finicking. No. 39, by James Thwaites, is very tastefully designed and coloured, but upon somewhat too minute a scale for the purpose.

Class B.—No 42 is a frame for a miniature, engraved and champlevé enamelled on metal, by Alfred Gray. The shape of the frame is far from elegant, and the colour of the blue enamel is too monotonously even and hard, and the metal left too clumsy. The effort has been a praiseworthy one, but the result far inferior to the Oriental or twelfth century work of the same description. It corresponds rather with the garish modern French—variety and subdued tones of colour are what should be sought after by aspirants to become revivers of this interesting process.

Nos. 42 and 43 are by J. B. Evans, whose name appears often in the list of contributors. These examples of decorative earthenware show powers which we would fain see better directed than in eternally reproducing vapid Renaissance scrollwork.

Nos. 45 to 49 are creditable attempts to execute the filagree glass, after the Venetian type, in champagne glasses, by J. C. E. Barnes. The filagree patterns are regular and delicate enough, but the glasses are as heavy as lead, and inelegant in form.

Nos. 118 to 120 are by Joseph Leicester, upon a large and more ambitious scale without the filagree. The forms in Nos. 118 and 120 in delicate opal and bluish-green glass respectively are excellent, and the glasses are commendably light; the ruby specimen, No. 119, is not so elegant.

Nos. 50 to 53 by another frequent competitor, Charles Pfänder, and No. 54, by C. W. Pfänder, jun., studies for book covers, consist of skilful intricate Renaissance and Elizabethan designs well balanced and arranged. We trust, however, that when wearied, as these artists must eventually become, of this character of work, they will try their hands upon some better and purer style, and bury the resuscitated griffin; also that they would devote some more study to the figure before they indulge too freely in Cupids.

No. 55, set of fire-irons, are coarse and clumsy.

No. 56.—Silver drinking cup in the Italian style, by Alexander Crichton. The ornamentation is by no means badly designed, but the form, as seen in the profile, is inelegant, and it is not very delicate or correct in execution.

Nos. 57 and 58, Envelope cases, though elaborate, are below criticism.

Nos. 59 and 60, Designs for balconies in

wrought ironwork, are better in arrangement than in workmanship, the foliage not being properly modelled or hammered out, but only coarsely twisted to the shapes suggested.

We have now completed the second division. The third consists of articles sent in for exhibition, in addition to those in accordance with the prescribed designs and processes. Greater freedom does not in this instance seem to have tended to produce a higher class of work; little indeed in this department claims any attention. We would except the mask, *repousse* in copper, copied from one of the heads of the Laocoon group, by G. Deen, but then this does not pretend to be an original design. The only piece of ornament that we really admired was No. 74, a pierced circular metal dish, by A. Millward.

Nos. 76 and 77, however—inlays in various woods, by W. Clayton—are interesting, as showing what a powerful material for ornament that in question is. The colouring is rich, though we suspect some of the wood to be artificially dyed, which is a mistake.

The wood carvings are, to our mind, especially weak, and their purpose ill directed. We could not except from the latter censure even No. 85, "Panel in birchwood for a sideboard door," designed and executed by William Matthews; still the effect of it is certainly rich and picturesque.

We should have been far better pleased if, instead of the numerous pretentious failures in this exhibition in the way of attempted designs, there had been more modest studies, such as No. 90, "A patera modelled from nature," by John Long. No. 99, model of the Florentine boar, by W. Marshall, seemed a good miniature reduction, and No. 101, the figure of "A North American Indian," modelled by A. Dufour, to be a spirited statuette. Nos. 122 and 123, two plain champagne glasses with twisted stems, by Elijah Barnes, are graceful in form and delightfully light; and No. 126, tea service, designed and executed by Isaac Wild, was delicate in design and refined in colour, and certainly very cheap at the price named.

In concluding our own article we feel we need do no more than echo the wish expressed in that which followed the first portion of this in the last number of our journal, that more workmen would avail themselves of these opportunities offered by the Society of Arts; at the same time we would beg those upon whom devolves the duty of selecting the subjects to be copied, to exercise far greater caution than was used on the last occasion. Objects of a less elaborate character, but clear and precise, and pure in general design and detail should in every case be chosen, and in no instance a sketch, even by Raphael, of an unfinished work. The vice of our art workmen is carelessness and want of precision, and if the Society of Arts could next year obtain one dozen single well modelled leaves it would do better service than it has done this time, by encouraging the production of thickets of slipshod naturalesque and conventional foliage; and a hand or a foot well modelled is worth a dozen malformed cupids and ten dozen nondescript monsters, even though hanged up, as their authors deserve to be, to an equally ornamental gallows, with due regard to symmetrical arrangement, like turkeys at Christmas in the shop of a fanciful poulterer. It is sheer wickedness to misdirect anxious students to study false models of taste and to condemn them to pass months of their young lives in copying what is stupid and vile simply because it is clever; and such we maintain most of the Renaissance rubbish to be, which the exhibitors of this season have had set for them, or have set for themselves, as models for imitation.

The third pair of buildings for the National Hospital for Consumption, Ventnor, will shortly be commenced, Mr. Frederick Beck bearing the cost of one, and Mr. John Buckle that of the other.

ON ORNAMENTAL ART.*

By Henry O'Neil, A.R.A.

THE principles I have laid down have chiefly regard to the treatment of form, but all, or nearly all, are equally applicable to that of colour. For harmony, though commonly applied to colour and sound, is felt to a great extent in the appreciation of objects that appeal most strongly by form. But of all the qualities wherewith we perceive that nature is imbued, there is one which may be termed the sum of all—namely, congruity—and its absence in ornamental art is chiefly to be deplored. Now our errors arise from a love of imitating—actually as far as art can do so—the works of nature; and also from a childish fancy that because those works please us in their proper place, their artificial representation should equally please us whenever an opportunity is afforded of displaying our talent in that direction. Nothing can be more erroneous, or even more repulsive to common sense, which, in spite of its detractors, is now, and I hope ever will be, the motive power in fashioning human wants and wishes. When we enter a room, who on earth expects to walk upon roses or other flowers, or to see Nature's works represented by art in places and on things where they never could appear? Nay, the more perfect may be the imitation the greater is the offence. And indeed—in every art—you, as artists, should regard mere imitation, however useful to the student, as a feeble mode of conveying to the spectator the impression produced on yourselves. The rendering of that impression should be your sole aim in any art, and more especially in that termed purely ornamental; for though the means whereby you work are powerful and characteristic, yet are they so limited—as compared with those at Nature's disposal—that in the rendering of any scene, even of any object in nature, it is absolutely incumbent on the artist to give predominance to those parts which shall give the most intelligible idea of the whole, as seen by the light of his individual experience. For art is a compromise, and more eloquent in proclaiming the great truth to be represented by the sacrifice of all lesser truths. In colour and effect of light and shade this doctrine is most salutary and well-founded, because their strength is elicited by comparison. But even in form there will often arise a necessity for such compromise, so far at least as regards the rejection of details not absolutely necessary to the intelligent representation of any object depicted.

There is one more quality in Nature, which, though as regards ornamental art, it is more needful in colour, is yet a useful adjunct to form: and that is "propriety." For there is no form the beauty of which cannot be enhanced by colour. On this point, however, oral teaching is of the least avail. You, as students, must steadily observe, and faithfully copy nature's work; and the natural, and in a lesser degree, the pictorial presence, can alone benefit you in acquiring that experience which, though the offspring of knowledge, is yet the parent of taste.

Now, on all these matters which I have briefly discussed, we may all derive most salutary lessons from those whom we are pleased to regard as barbarians, compared to those whom we are equally pleased to call the most civilised nations of the world. For beauty of form, and harmony of colour—moreover, for the absence of that puerile imitation of natural objects, which I pronounce so detrimental to Art—no manufactured productions of France or Germany, still less of our own country, can equal the rugs and carpets of Turkey and Persia. I have only heard one objection raised against them—I grant a strong one—and that is monotony. But without insisting that too great monotony is less an offence against taste than too much variety, I ask you to look closely at those productions, and comparing one with another, you will discover differences, however slight, in form. Moreover, you will perceive a great variety in the combination and tone of colour, the latter being brilliant without gaudiness, and the former ever harmonious.

But whilst I object strenuously to the introduction of natural objects where they have no right to appear, and deeply as I reverence the presence of simplicity, I have no regard for those ascetic disciples of Art who affect to despise ornament in any degree. I neither envy their isolated, however exalted, position, nor can I share in their affected appreciation of simplicity—even to monotony and poverty—in form and colour. Though I strongly object to carpets covered with imitations of flowers, I fail to see the infinite beauty—though I acknowledge the utility of the article—in the monotony of crimson or green drugget; and the common practice of covering our tables with a cloth evinces a dislike to plain wood, however preferable that may be to a more composite article; nor because I think the representation of fruit or flowers on the backs of playing-cards is out of place need they necessarily be without some indications of form and colour. Mere utility is the first object; but that surely may be combined with qualities of an equal, if not higher order; to excite feelings which, in spite of sectarian impulse, will ever have their sway on humanity,—and worthily too,—for whatever gives pleasure to the eye and ear, or other channel to the mind, contributes, even though indirectly, to mental wealth; and the unswerving aim of those who work to give pleasure to others, and of those who live merely to receive it, should be so to fashion the work on the one side, and to refine the desire on the other, that the result may equally contribute to mental health. To this end, the possession of that indefinable quality we term taste is alone necessary. But of all mental acquirements it is the least intuitive; and it can only be gained by the most patient investigation of the materials proffered for its daily sustenance. You will probably ask, as this is so difficult of acquirement, "On whom is the student to depend, in order to correct the errors of ignorance or inexperience?" It is easier to tell him "what to avoid" than "what to follow." And, moreover, in telling him merely "what to avoid," it is very difficult for the teacher to be thoroughly honest without giving offence. But any man in the position I occupy at this moment would be unworthy to address you were he to shrink from saying what he feels to be true from any paltry fear of offending individual vanity, or, still worse, national pride. I fear I must do both; so, unlike the timid bather who, with much shivering, steps ankle-deep into the water, I will take a headlong plunge. In the first place, then, beware of the overpowering influence of public criticism. A French critic on art, lately alluding to the rapid growth of art-criticism, was honest enough to declare that in proportion as the science had advanced the art had retrograded. I cannot wonder that such a result should spring from lay interference, and I cannot but think that the present influence and prosperity of the critics denote a corresponding want of mental activity on the part of the public. Evidently, in spite of the spread of education—either through indolence or an exclusive attention to worldly affairs—we are all more or less disinclined to judge for ourselves, especially in matters pertaining to art. And thus a race of professional thinkers has sprung into existence to supply our intellectual wants. Now I cannot but look upon this extreme subservience to the opinion of others as a base abandonment of reason—man's noblest birthright. Moreover, I defy any man to do his work properly if he is continually influenced by the contradictory opinions of those who presume to be public advisers. You know the fable of the old man and his ass; so on this point I will say no more.

Secondly, Who are these critics? Well, I know personally that many of those officious gentlemen who benevolently seek to instruct artists have simply failed as artists themselves; and a doubt naturally arises whether failure in any pursuit is a proof of a man's ability to give profitable advice to those who are desirous of succeeding where he himself has failed. Lastly, and especially, because, being anonymous, they are perfectly irresponsible; and can safely indulge in prejudices, to favour or condemn, under the deceitful mask of public duty. It is not in the nature of a critic to omit an opportunity for lauding the talent of a friend, or, on the other hand, to avoid saying a smart thing of one in whom he takes no interest, nor cares he what pain or injury may be caused by his cat-like playfulness. For that there is no help. But when he says—with such additional importance as a plural pronoun can give—that he is the mere utterer of public opinion, I differ from him entirely. He takes far too modest a view of his calling, which he knows well is, not merely to echo public opinion, but simply to influence it, and his judgment—given anonymously—will be valued wholly by the importance of the journal wherein it is published. Now I boldly maintain that such a practice is equally unjust to the public writer as to the public reader; and I hope, at no very distant time, to find the presumptuous and irresponsible "we" changed to the modest and straightforward "I"; and that every man who

* From a paper read before the Associated Arts' Institute on Saturday evening, February 5, 1870. (Continued from page 121.)

prints a syllable shall be known by name, and his words be accepted or rejected—as a cheque is by a banker—from the known responsibility of the utterer.

Then, again, I warn the student not to place implicit confidence on the opinions of those who are termed the *dilettanti*, or simply mere lovers of art, in contradistinction to those who follow it as a profession. I honour them for that very love; but as guides I cannot accept them, and for this simple reason, that their love is not cosmopolitan. Your perfect *dilettante* has only one love in each art.

And now that I have told the student in search of taste what to avoid, I am bound to tell him what to follow. Briefly, then, he should follow himself, and himself alone, if he wishes to obtain that self knowledge which can alone lead him in the path of truth. Above all should the student in Art assert his individuality if he wishes to thoroughly perform his mission on earth. From his own observation of Nature and Art can he alone collect worthy material for the pleasure of others and the profit of himself. In a second, and scarcely inferior degree, let him bear a reverence, not a blind love, for those who have produced great works in the present; nor let a hasty dislike shut his eyes to the merit of those which have received the admiration of ages. Fear not the imputation of conceit because you are earnest and steadfast in maintaining your opinions. No great work can ever be achieved without a proper amount of self-confidence. The belief that success will be attained, coupled with the modesty and good sense to acknowledge a partial failure, will ever lead to nobler efforts. Such confidence as springs from the knowledge of your own integrity and earnestness is a sign of health and strength, and is very different from the conceit which arises from an unwarranted belief in natural ability. Deeply as I reverence genius as a heaven-born gift, I honour much more the untiring industry which is purely an acquirement, and without which the highest genius is of no avail. For I am a firm believer in the healthy doctrine that man can accomplish whatever he earnestly wills—not passively, but actively; not in dreams, but by downright work.

But what I most deplore in this practical age, as mainly detrimental to the progress of Art, is that though the public individually take the greatest interest in its progress, the nation collectively takes very little; and so Art has not that public footing here which it has in France and other countries. I fear, moreover, that the prospect, at least for the present, is not very inviting, either for those who follow the pursuits of Art or for those who benefit by their labours, either in the way of instruction, or even of pleasure. It might have been meant as a joke, but it was a poor one, when our present First Commissioner of Works lately declared in public he would take good care that "professional persons," from painters down to market-gardeners, should not bamboozle him into loosening his tight grip on the public purse. Now if on this weighty matter the right honourable gentleman is the accredited organ of the Government, it would seem that the liberal views it professes do not extend to that care for the innocent pleasure and the intellectual profit of the public which has ever actuated the most popular governments, ancient and modern. It would moreover appear, taking into account the peculiar idiosyncrasy of our learned First Commissioner of Works, that the post he fills is so unimportant that special fitness is not required for the performance of the duties attached to it. On this point, however, I beg leave, most humbly, to differ with our present rulers; for I am sure if, before accepting office, that right honourable gentleman had been sent to a national school of art for only three months, he would, unless naturally obtuse, have entered on his new duties with a more lively and more healthy appreciation of the public value of Art than that which at present he unfortunately entertains.

And now having, I fear, offended individual vanity, I must further give offence to national pride. The plain fact is that, compared with our Continental brethren, we are sadly wanting in taste; and the deficiency is not confined to one class, but, in a proportionate degree, prevails in all classes, especially those who are exclusively called "working men." This fact has lately been dwelt on by public speakers and public writers, and they regard this inferiority in taste as the sole reason why—with all our known energy and ingenuity, coupled with the natural advantages we possess—those foreign manufactures, in the production of which Art has assisted, should find a readier sale in markets hitherto supplied by our own. But when a return to protection is recommended as a remedy for the evil complained of, I reflect on the wisdom of the well-known fable, and, instead of calling on Jupiter to help us, would it not be better to boldly put our shoulders to the wheels and force the cart out of the ruts into which it has momentarily plunged?

The causes for our inferiority in taste, according to the public speakers and writers to whom I have alluded, if their assertions be true, are not complimentary either to the national character or to the wisdom of those who have hitherto guided the destinies of this great empire; and I believe that one cause is put forward to hide their shortcomings on the other. Public opinion says that foreign workmen are "by Nature" more imbued with "taste"; and secondly, that they are more cultivated in Art than are, unfortunately, our own. But I deny, most strenuously, that Nature has anything to do with the presence of taste, and assert that it is solely an acquirement, resulting, in a partial sense, from contact, but chiefly from cultivation. Here is our real want; and who can wonder at our deficiency in taste? True, we have a few good public collections of pictures, and many national schools of art, most efficiently conducted. But how or when can the "working man" reap the full benefit of such institutions? Why, either by neglecting the work on which he depends for his daily bread, or when, worn with the manual labour of the day, he has no energy—however great his mental desire—to make use of the proffered food.

How different is the artisan's position abroad, and how much more paternal, however despotic, is a Government which affords him ample means for innocent enjoyment—directly, for cultivation; and indirectly, for moral improvement—than that which, although the creation of freedom, virtually prevents its subjects from reaping the material benefits to be derived from the influence of Art. And this leads me to a question which is ever uppermost in my mind; for I believe the course I have in view is not only beneficial in a wordly sense, but in the highest degree moral and holy. I allude to the opening of our national collections of Art and Science on Sundays—a motion on which subject, during the last session, was introduced by Mr. Gregory, the member for Galway, and, I am sorry to say, not boldly rejected, but *pusillanimously shunted*, by those who ought, in their zeal for education, to have given a patient hearing and an official verdict. For much more than most men imagine depends upon the settlement of that question. I know well that, in time, it will be settled, and in the direction I wish it; but delay in legislating for moral or intellectual deficiency is fatal. The hour passes away, and subsequent regret only proves our weakness in not seizing the opportunity of the moment.

Let us, however, return to facts, and when we have acknowledged their presence let not prejudice interfere in refusing what reason demands. I acknowledge freely, though with regret, that our artisans are deficient in taste compared to their foreign brethren. I further said that such deficiency was entirely owing to a want of cultivation; and lastly, that the means of cultivation, though offered to some extent freely, were under such restrictions as prevented their having any beneficial influence. I acknowledge the excellenee of the National Gallery, the British Museum, and that at South Kensington: and, as regards the latter, I think that Mr. Cole and Mr. Redgrave deserve the thanks of every one interested in the promotion of Art-education. But when we turn to France, we find that such collections of Art and Science are not confined to the capital, but are to be seen in every town of any importance; and the same may be said of even the smallest States in Germany. Moreover, those sources of innocent pleasure, and of moral and intellectual improvement, are open freely on the Sunday—that day which throughout Europe is recognised as the "working man's" holiday, or day of rest. Yes; let it be a day of rest as far as the labour of the hand is concerned; but, as to the mind, inaction is no more possible than in any other work of Nature; and let us take care that the weeds therein do not predominate from want of proper care for the growth of a better seed. The Creator lets no day or hour interrupt the beneficent labour of Nature to provide for bodily wants, and it is simply human perversity which prevents us from reaping what He has sown in man to satisfy those of the mind. Our best worship is the appreciation of everything created for our welfare; and of the Creator's gifts human genius is the highest—a spark, however feeble, of the Divine Intelligence. So let our rulers decide whether a "working man"—reluctantly, I use that title in a narrow sense—would not be better employed in contemplating the productions of Art and Science on a Sunday, than in lounging at the door of a public-house, with a wistful eye on the church clock.

TOWERS AND SPIRES.

At the last meeting of the Liverpool Architectural Society, a paper was read by Mr. G. H. Ridsdale, on "Some Architectural Effects of Proportion and Detail," from which we take the following, on towers and spires:—

Many architects, said the author, have planted spires much better adapted for a country site in crowded streets, not that it is desirable to have any repetition of Italian spires in modern churches, but town churches seem to be capable of bearing a much more varied outline and elaboration of parts in the upper stage of the tower, and the base of the spire than would be in harmony with a rural and open situation, and Wren's spires offer many suggestions for variety of design, and are certainly worth a much more attentive study than usually falls to their lot; also some mediæval German examples afford hints for newness of treatment.

There is perhaps no more difficult item of design in architecture than the successful placing of a spire on a tower, and producing at the same time a novel and striking effect in the pinnacles and broaches, and which shall also combine well with the tower as a whole. As a variety in Mediæval examples I would point to Desborough, where a very good outline is gained by a broach spire, with parapet against the spire; but though the effect is pleasing, it is ridiculous to put a parapet in such a situation.

There are many very instructive examples of successful treatment in French churches in this department of design, and a valuable paper might be written by some one who knows them more intimately than I can pretend to do. To combine the tower and spire, splaying the angles, has often a very beautiful effect; there is a church at Rock Ferry in which this arrangement of tower and spire is carried out, producing a very pleasing proportion; and several Mediæval examples in Germany and France; while in England, I know of only one, that of Laughten en le Morthen.

Some features of a steeple form in Indian temples, at Benares and elsewhere, are instructive, showing variety of grouping, and might lead to suggestive hints, if carefully studied.

Perhaps no building or portion of a building is so purely a matter left entirely to the skill of an architect as a tower or spire, as this demands less special attention to convenience than other forms. The problem would seem to be, in the case of a tower, given three square lines, with the earth for a base, to clothe them with beauty—a problem that has been most variously and successfully worked out.

That it is a difficult one, many here present will be well aware; there appear to be one or two parts especially demanding skill on the part of the designer. The upper stage seems to be the most important, as you may see by looking at towers which have no special feature of interest, or a small unimportant window at this stage. The next would appear (in detached towers) to be the buttresses, and these are most difficult to treat successfully at the upper and lower stages; many a tower is spoilt in the lower set-off to the buttresses, and in the way they join the tower at the top.

The next point in importance is that immediately below the upper stage, which has a very powerful influence upon the effect of the tower. The lower portion would appear to come next in appearance, and many towers at the west end of churches gain much beauty by the large windows here placed, lighting the naves behind; while a badly designed stage just over the lower story will throw a tower all out of proportion; indeed, it is often the most successful treatment to leave this portion almost plain, which our forefathers seem to have been well aware of.

As an example of the several stages worked out to their fullest extent, perhaps Grantham, Northamptonshire, may be quoted. In this case the two upper stages are of nearly equal importance, a treatment only suitable where great loftiness and multiplication of parts exists.

The Norman towers of England perhaps are unsurpassed for their simple grandeur of outline, accompanied, in many instances, by great beauty and richness of effect—an effect of dignity often due to the use of detail much repeated, on the principle that monotony well managed often produces repose and grandeur.

Many of these towers have fallen, in a great measure owing to their being frequently ashlar, faced on each face with hearting of mere rubbish, though the walls are of great thickness. Many also have had spires added of later date, as at Castor, but Southwell Minster, Durham, and other and numerous examples, retain much of their simple grandeur and beauty.

The towers of Exeter are worthy of remark from forming the principal portion of the transepts to the building; I believe they are the only examples of towers so placed, at any rate in England. This arrangement seems capable of producing great dignity and beauty, if worked out on a grand scale.

Norman towers embody the beauty of simple majesty of outline rendered effective by massive yet varied detail contrasted in a simple manner, thereby gaining a quiet dignity purely their own; and so far as I am aware have more merit as architectural features than towers of similar date on the continent. The peculiar dignified beauty of the Norman seems a very desirable effect to retain in modern architecture, though the style in its purity is but little adapted for present use. Mr. Huggins has suggested its combination with Greek, and probably great beauty might be the result, and the suggestion is a valuable one. In no style is there more scope for study of round-arched arcading balanced with wall space than in Norman.

Norwich Cathedral internally has an effect that one might almost imitate in a Classic structure.

We shall find that Early English towers without spires are not nearly so numerous as those in other styles, and they have also been very generally surmounted with that beautiful addition at a later date; they are generally remarkable for great beauty and elegance of design, and for much richness of effect gained by arcading, and frequently by shafts at the angles, as at Peterborough.

The beauty of towers of this style generally seems to lie in their gracefulness, an effect rather of detail than of mass; towers with traceried windows seem to gain much by the stronger contrast of boldness and richness than seems possible with only lancet openings and arcades; a style combining Early English principal features blended with Saracenic, and even Greek minor details, might be worked out with the plentiful use of iron, which should be very suitable for light and elegant structures, and particularly for hot climates.

Decorated towers are generally beautiful examples of grace combined with dignity, and are among the most pleasing specimens of architectural design. Beautiful in outline from the gradation of their buttresses, rich and pleasing in detail, they embody a refined yet vigorous taste, and I can confidently state that designing was never so pleasant to an architect as when the beautiful English Decorated was the prevailing fashion, some fifteen years ago; and who does not know the strong inclination almost imperceptibly to infuse much Decorated feeling when designing in other styles, and he feels himself, as it were, using mouldings and parts less graceful than he has at his finger ends, and which he longs to use? The fact was, we found the style too perfect, and, unable to advance upon it, tried back to make a fresh start, introducing much earlier foreign detail of far less intrinsic beauty, however valuable as affording fresh scope for variety of effect.

The Perpendicular towers of England, dignified, majestic and elaborate as they generally are, and embodying a certain peculiar effect so pleasing, and seemingly so admirably adapted to a tower, we may place in the front rank of towers; I know of no other class so beautiful. These, like the Norman towers, gain much by a certain monotony of parts, as, for example, in S. Mary Magdalene's, Taunton, where the same species of window is repeated in the different stages of the tower.

Much of the beauty of Perpendicular towers arises apparently from a certain greater gradation of verticality of parts. If you will compare towers of this style you will, I think, see what I mean.

Notwithstanding their great beauty, in the Early English and Norman towers this principle of verticality is perhaps, comparatively speaking, rather harshly insisted upon, and contrasted too strongly and abruptly with the horizontal lines; of course I am speaking relatively. The general simple bold outline of the towers scarcely blends with the numerous wall shafts, the gradation appears too abrupt. At Salisbury, indeed, a very late example of the style, where the angles have octagonal turrets of rich design, this is not apparent; the round or simple lancet arches in a less degree reduce the horizontal strings to their proper position of subordination, and in the Decorated towers, except early in date, as the beautiful central tower of Lincoln, there is frequently an exaggeration of diminution in stages, which, however beautifully managed, and producing a charming effect of blending and diminution of mass, perhaps fails in that higher quality of grand dignity and simple majesty which ought to be the attribute of all large towers, and which is so admirably displayed in Taunton and other Somersetshire examples, and also pre-eminently so in the Tower of Magdalen College, Oxford.

This difference of feeling may be observed in the upper stages of the western towers of York Minister, which have been finished at a later period than the lower. However beautiful the staging of the buttresses generally is in the Decorated period, perhaps it is surpassed in effect by the greater severity of outline of the Perpendicular. And again, the great size of the windows in Perpendicular towers, and the contrast, as I said before, of the vertical parts, is so gradual and pleasing that a higher class of effect is attained than in other styles. We have, for instance, the bold angle outlines contrasted with the mullions and again with the upright lines of the tracery, producing a beautiful scale of gradation.

Of spire towers, in this style, Whittlesea is well worth attentive study for the manner in which the buttresses and staging are designed. Perhaps the lower story is a little over elaborate, and would gain by being plainer. There are few more beautiful steeples than this in the country.

ON ORNAMENTAL IRONWORK.

THIRD LECTURE.

MR. CAPES delivered his third lecture on this subject at the Kensington Museum on Monday evening last, the attendance, as on the previous occasions, being large. After briefly recapitulating the principles laid down in his former lectures, he proceeded to enter into the practical application of those principles, with a special view to the present circumstances and future position of art workmen, and with a view to help in their self education. The gift of originality of invention was given to but comparatively few, but the more heartily and perseveringly we tried to do what was good, the more clearly should we understand what was really good in the works of others. The lecturer next entered into an exposition on the rules which should guide the workman in designing and in judging of designs by others. He laid it down as a fundamental rule that the works of Nature should be taken as models by the art workman. But how was Nature to be imitated? There were different opinions on this point, and very opposite views were taken on the subject by men of great ability, and therefore in expressing his own opinions without reserve he must be understood as paying the utmost respect to those with whom he differed. It was thought by various writers that we should not aim at copying exactly anything whatever that Nature creates, but should adopt a conventional treatment—*i.e.*, that we should invent new leaves, flowers, or fruit, for ourselves, bearing some sort of resemblance to the real works of Nature, although at the same time somewhat different to them. As examples of this treatment Mr. Capes instanced the *fleur-de-lis* and the Grecian honeysuckle, the former being based upon the lily, and the latter upon the unopened bud of a honeysuckle. He had not a word to say against the use of conventional forms, whether in stone, wood, or metal, but when it was said that none but those conventional forms were to be employed by the art workman, he thought the injunction perfectly unreasonable, and that those who laid down such a rule were misled. In the first place, why should we not copy exactly the productions of Nature? It was admitted on all sides that certain productions of Nature were in themselves eminently beautiful—why, then, should they not be imitated in art? Surely for so rigid and unpleasant a prohibition some very good reason ought to be forthcoming. The resources of ornamental art could not but suffer from such severe "Puritanism." The advocates for the exclusive adoption of conventional forms confused *imitation* with *deception*, and overlooked the fact that even the most literal interpretations of natural objects in wood, stone, iron, gold, silk, wool, or paper were always conventional, and totally guiltless of any attempt at deception. It was true that when an art workman proceeded to copy a flower he must make his copy more or less different from the original, for the simple reason that it was beyond his power to copy all the wonderful and delicate work of Nature in the material in which he was working. No skill could imitate all the delicacy and beauty of the rose in such a material as iron, and, for the same reason, an iron flower or wreath must necessarily differ from one in stone, wood, earthenware, or even in gold and silver, as the latter metals were capable of being beaten out to a greater degree than iron. Art-workers in iron, as well as in other materials, should carefully study the qualities and limits of the material in which they worked. They should also bear in mind the means they had of fitting the parts of their work together. The use of the screw in this respect was well worth study, especially where it was desirable to hide the joints. Returning to the general question as to the imitation of natural objects, Mr. Capes said that was a very different thing from the attempt at absolute imitation which aimed at deception. To attempt at reproducing a flower, wreath, or tendril in iron was not art, but trickery. Artificial flowers, such as ladies wore, were often wonderfully clever, especially those made in France, and very often could not be distinguished from real flowers at a distance; but, after all, they were shams, and not works of art. He would impress upon his hearers that the duty of art was to suggest the realities of life, but those shams suggested nothing; they tried to make one believe that the real thing was actually before him when it was not. Artificial wreaths and flowers, whether in wax, silk, or calico, though they might be pretty ornaments for a woman's head, were not works of art. Mr. Capes passed on to recommend his audience to thoroughly cultivate their tastes if they wished to qualify themselves as good designers, as such a course would, while materially increasing their capabilities as workmen, increase their enjoyment of works of art of all kinds. They should take every opportunity of studying good specimens of all art-work. The peculiar facilities afforded by the Kensington Museum in this direction were next pointed out at some length. No species of art workmanship, said Mr. Capes, stands alone, and the more that any particular class of art workmen knew of the merits of other kinds of work, the better they would understand their own particular branch. All art rested on the same principles, and when art workers in any one branch saw those principles carried out in good specimens of other arts, they would observe those principles in their own special department. In the same spirit, Mr. Capes strongly advised his hearers to study public buildings, and especially Westminster Abbey. In that building, however, the towers should not be studied, as Sir Christopher Wren, their designer, did not thoroughly understand Gothic architecture. The monuments should be carefully studied, for two reasons, first of all in order to show what horrible monstrosities and absurdities could be perpetrated by people ignorant of the first principles and rules of art; and, secondly, because some of the monuments, especially the older ones, furnished admirable specimens of ancient metal work. In fact, there was scarcely a single feature in the Abbey which would not repay study. Above all, Mr. Capes exhorted his audience to the study of Nature herself in the trees and flowers of our public parks and gardens, and, wherever they could, in their own homes. After dwelling at some length on the advantages offered to the student of Nature and art by our public parks and gardens, Mr. Capes concluded by saying that in Nature only was found without any failure the two great secrets of all true art, reality and life; grace, reality, truth, and life, let us ever remember, are the qualities without which all art is utterly worthless.

The fourth lecture will be delivered on Monday evening next.

There is a movement on foot for the establishment of cottage hospitals in several of the manufacturing towns and villages on Tyneside. Jarrow and Walker are each likely to possess one of these admirable institutions shortly.

The Fine Arts.

THE GENERAL EXHIBITION OF WATER COLOUR DRAWINGS AT THE DUDLEY GALLERY.

THE Dudley Gallery is a spirited little exhibition; it began well some five years ago, and has gone on improving ever since. It has the merit, too, of being a very varied exhibition; all kinds of art-talent find bere a field, though a very small one, for the display of their eccentricities. It represents the extreme youth of art, with all its vagaries and all its affectations, but, at the same time, with all its enthusiasm and its promise of future merit. The exhibition this year contains many interesting works, and it is a great pity that the defective lighting renders their being seen at all on a dark day, or even on such days as we must expect at this particular season of the year, a matter of very great uncertainty. At the private view, during a passing shower, the room was so dark that the gas had to be lighted, that great enemy which, by its glamour of yellow light, destroys all the delicate colouring of water colour art.

The picture we prefer to all others this year is "Poetry," by E. J. Poynter, A.R.A. The beautiful intention of the head, and the tender, dreamy expression of the face, so occupy the attention that it is some time before you remark the excellent method in which it is painted, and the peculiar beauty and delicacy of the colouring. His head of "Jessica," on the screen, is also a fine work of art. The portrait of "Mrs. E. Burne Jones" is peculiar; remark the different tones of blue in the picture, and the masterly way in which they are treated. Why Mr. Poynter should have sent with such finely-wrought works his insignificant litte sketch of a tree, much like a copy for a beginner to study from, is a mystery to us, and one of those vagaries of which the exhibition is full. G. D. Leslie, A.R.A., has, beside his figure picture, which is a beautiful bit of subdued colouring, sent an exquisite landscape, a part of the garden of "Bray Vicarage"; the breadth of treatment and the perfect light and shade of the picture are beyond praise. The fame of the Leslie name seems likely to be perpetuated in the art world, for in this exhibition are several landscapes of great promise by a grandson of the first Leslie, who seems to us to look at Nature in an original manner, while he gives a great air of truth to his works. No. 207, "The Last Look at the Old Home," and No. 253, "Sandwich Flats," are his two best performances in this exhibition, but all his pictures hold out hope of future excellence. Mr. Simeon Solomon and that school of which he is the head, appear in great force at the Dudley. They certainly have peculiar views of Nature. That their colouring is good and artistic, and might, in exceptional light, and under exceptional circumstances, be like an effect of Nature, we do not deny, but we deny that it is always necessary to paint this effect, and to sacrifice to it light and shade, relation between foreground and background, and correctness of drawing. These painters delight in mystery, but they forget that vagueness is not necessarily mystical; they seek for grandeur of form in their figures, and imagine, like children, that it is to be obtained by adding to their size. After Mr. Solomon, whose "Young Rabbi carrying the Scrolls of the Law" is a really clever work, rich in colour, and excellent in effect, Mr. Clifford appears to us the best representative of this school. His picture called "Old Songs" is painted with feeling, and there is power in his larger work of "Jacob and Esau"; but the other members of the brotherhood descend by gradual steps to the depth of Mr. Wooldridge's "Meeting again in Elysium." What a draughty place it must be to have given these children of Anak such swollen necks, and to have blown nearly all the leaves off the trees! Mr Marks has taken the subject of his large work from a tale only to be read in fairyland, and a very attractive piece of decoration it is. "A Letter to the General," by A. C. H. Luxmore, is a picture of merit, though a little too neat and clean. Mr. Arthur Severn's "View of Westminster and the Thames," is rather black; we suspect he has taken a larger field of vision than his paper would properly accommodate. Mr. Legros has chosen an unfortunate background for his "Study of a Head." Of several good landscapes by A. B. Donaldson, the one called "Nuremberg" is the best. We much admire this painter's colour, though he sometimes exaggerates the red of his roofs. No. 63, "The Citadel, Nuremberg," by C. Earle, is also a very clever work. No. 83, "Clarissa," by J. Playfair, is highly finished, and would make an excellent slide for a microscope, but when contemplated as a whole the result is less satisfactory. Mr. Frank Walton has five landscapes in the exhibition; they are all painted with his usual care and true feeling for Nature. Mr. Mawley is also well represented. There is great merit in the picture called "Hoeing," by H. Heskorner, though Mr. F. Walker's influence on the painter is somewhat too strongly marked. The one fault we find with this exhibition is the large number of inferior heads which find a place here, amongst which are some of the inevitable Academy models, finished up, and decked out with artists' properties to deceive the eye. Most of the landscapes, on the other hand, are of more than average merit, No. 52, "The Friars, Aylesford" by W. F. Stocks; No. 90, "Richmond Castle," by G. A. Scappa; and No. 552, "Rusthall Common," by M. A. Langdale, deserve attention. We cannot close our notice without mentioning a very clever little work on the screen, by E. J. Gregory, called "In the Gloaming"; the composition is excellent, and the feeling and colour of the summer eventide with the contrast of the burning weeds is most truthfully rendered. In conclusion, we must remark that the Dudley is more catholic than any other water-colour exhibition. It admits freely those who like to send their performances without distinction, their placing being subject only to the approval of the committee. To exhibit in either of the two long-established water-colour galleries, the painter must have already obtained a reputation, and have been elected a member, but the Dudley generously gives every beginner an equal chance, while it accepts with pleasure those works sent by more advanced members of the profession. Some years ago the Institute and the old Society might have done a graceful deed by admitting outsiders to their newly-begun extra winter exhibition, but with the conservatism belonging to such bodies, they decided against extending this helping hand to their brethren in art. It was just at this time that some enterprising spirits started the Dudley Gallery, and its exceptional success has rewarded their good endeavour.

ON THE CULTURE OF THE FINE ARTS IN ITS INFLUENCE ON INDUSTRIAL PURSUITS.

MR. HYDE CLARKE delivered a lecture on this subject before the Society for the Encouragement of the Fine Arts on Thursday evening, the 10th inst., Mr. Henry Cole, C.B., in the chair.

The lecturer commenced by enumerating the various aspects from which the subject of his lecture might be regarded. If a high point of view were taken, it might be considered a sort of national pride to record the names and the attainments of our artists. It was interesting, likewise, to consider our art position with regard to the other great nations of the world; and while we felt proud of such sculptors and painters as we ourselves possessed, we would regret, on the other hand, that we had none equal to Michael Angelo or Raffaelle—artists whose works brought distinction to the land of their birth. This was rather an æsthetic point of view—an aspect which regarded the arts in their intellectual relations—and, some might think, certainly not a utilitarian aspect. And yet it was very difficult to separate the utilitarian from the beautiful, although nothing appeared more easy. If a severe economist were let loose to reform the community, to redistribute its income, and to apportion its pursuits, it was very probable that among the "idle classes" he would seek to subdue and suppress would-be poets and artists of all kinds. "For," he would say, "in what do they contribute to the wealth of the country? They are mere consumers of a portion of the national income—they are mere ministers to the wealth and luxury of the better-endowed classes." There were many reasons for pausing with regard to such a view of the question. If we looked at the great scheme of Nature, we perceived that while on the one side all things were admirably adapted to their ends and useful in their applications, they of themselves suggested the Great Author and the Great Designer. In Nature we found the beautiful as widely distributed as the useful. If the severe censor or economist before mentioned was redistributing the whole income of society, if he had suppressed the artists, and the men who employed artists—he would ultimately find out that he would have to take from the coffers of the State a sufficient amount of funds to re-integrate and restore the men whom he had despised as mere idlers and consumers of the fruits of society. This was well deserving of the consideration of the public, for without regard to the culture of the fine arts, it was impossible for any country to properly carry on its utilitarian pursuits. The great nations of antiquity were well aware of this principle, and they adopted it and carried it out. In those colonies, states, and cities of antiquity where the arts were carried to the greatest extent, commerce flourished to a corresponding degree. Of late years this has been enforced upon us in the strongest manner by the rivalry of the other manufacturing nations of the Continent. The lecturer next proceeded to compare the respective positions of England and the nations of the Continent at the close of the great war in 1815, pointing out the far superior resources possessed by England, and the great disadvantages under which the nations of the Continent were placed, and asked why it was that, under these circumstances, the nations of the Continent gradually revived and restored their manufactures, and were enabled to engage in a fierce rivalry with us? To a certain extent, it was by a careful administration on the part of their respective governments—such an administration as we wanted at this moment at home, for we had not even now a true Minister of Commerce. In each country every effort was made to restore the dead branches of industry; and those efforts were greatly supplemented by important changes in the laws of partnership. But in a great degree the revival of Continental industry was due to France, whose population possessed a degree of artistic skill which never failed them, even during the war, and which they converted into an instrument of rivalry with us after the peace. We began to feel this competition about the year 1830, and at that time we were not embarrassed by the consideration of Free Trade, or of the treaty with France; on the contrary, prohibitive duties and a restrictive fiscal system were used for the protection of English manufactures. Our manufacturers felt the want of taste and technical education in our people, and about 1835 it came under the consideration of the Legislature and the result was the formation of schools of design. But these lagged on, for it was difficult to believe that we who possessed such advantages were in danger of losing them. But the period came when our productions were placed in competition with the productions of the whole world, under our own eyes, and great and renewed efforts were made to place us in a position to compete effectually with our rivals. In those efforts the chairman took a prominent part, and had it not been for the way in which he organised an effective administration he (Mr. Clarke) believed that at the present time we should be suffering in a still greater degree than we do now, and that we should feel still more the wants and deficiencies of our imperfect system. While by the course of legislation and the influence of social events, almost every means of cultivating the taste of the community was half a century ago practically abolished; while the male population was, to a great degree, without the means of cultivating its taste; and while a style of architecture of the most miserable character was in requisition, the female population, fortunately, was not so absolutely deficient in taste, for it was able to

appreciate the superiority of foreign manufactures. Its patronage of the foreign manufacturer forced the English manufacturer to compete with the foreigner by sending better articles into the foreign market, and thus contributed, to a great extent, to the resources of our own population. The lecturer next dwelt upon the natural connection necessarily subsisting between the cultivation of the fine arts as a matter of taste, and the culture of the public taste as connected with our manufacturing interests. With regard to a fine building, or with regard to a remarkable picture, we might not be able for a moment to trace the immediate connection between either of them and the production of so much printed muslin or woven silk; but that there was a connection in the whole and in the limits between those two products, there could be no real doubt. But if we were to attempt to cultivate the fine arts in such a way that we should only produce silks and muslins, we should undoubtedly fail. The lecturer next referred to what took place in some of the schools over which the chairman presided, where, at an early period, there was a disposition to apply these two principles—to seek the greatest amount of utilitarian results, and to keep out of the schools, as far as possible, all purely artistic instruction, because it was scarcely possible to conceive that the author of the fine painting and the designer of the admirable pattern could be produced by the same principles and by the same general process. At the first school which was established at Somerset House there was a positive restriction on the artistic instruction of the student, but as we came to understand the question better, there was a freedom from such restraints, and these principles have so much extended that at South Kensington we had an Academy supplementary to the one at Burlington House. If we went back in our own history half a century, and looked at the way in which the public taste was dwarfed and kept back by the state of our street architecture and the architecture of our public buildings, and by the limited nature of our public collections, we should see that negligence in the cultivation of the public taste must result in the want of artistic culture, and, on the other hand, that a proper culture of the public taste would result in the development of our industrial pursuits. It was not his object to consider so much in what way industrial progress should be promoted by schools of design and schools of science, as it was to consider those general influences by means of which the public taste might be promoted. With regard to one subject—painting—picture-galleries constituted one means of familiarising the public with works of art; such means, to a certain extent, were provided. There had been of late years a better, though by no means an adequate, provision in this respect. The chairman had taken a great interest in obtaining a better distribution of those art treasures that we had, not only in this metropolis, but throughout the whole country—for unless the *whole* of the population had their powers developed it was impossible for us to enter into rivalry with countries like France, Prussia, and Switzerland, where adequate provision had been made during at least half a century. What we had to do was not what we liked ourselves; it was not a question whether we liked to be utilitarian—whether it was more practical or more English to be utilitarian—the choice was no longer left to us; it was a matter which had been decided for us by other countries. It was very fortunate that, so far as painting was concerned, there was no want of aptitude on the part of our artists; and we had this advantage likewise—that their abilities had been developed in those departments in which the study of Nature had been observed. Our school of landscape was a fine one, likewise our school of the figure; our animal painters were distinguished; and in every department in which the study of Nature was concerned we had made good our position. With regard to sculpture, so far as the capacity of our artists was concerned, there could be no doubt that we had had in this country the foremost men; the name of Flaxman alone was enough to test that. But unfortunately, when we named even a man of the capacity of Flaxman, we had not his works; we had his designs, but there was no adequate employment of the genius of such a man. We had not the monuments of Flaxman's genius as copiously produced as they would have been in any other country who possessed an artist of his foremost rank. And yet the development of sculpture was a matter which came more immediately within the industrial domain than did painting. In the case of a great picture we could not always trace the immediate connection there might be between the work of a great artist and some industrial production. But we knew that there was an immediate relation between the colossal statue and the little statuette which the manufacturer placed upon our table; and though the attempt to train the sculptor of a great statue might fail, nevertheless a good workman might be produced. By the exhibition of a great work of art we cultivated the eyes and the minds of the men, women, and children of our population, and produced workmen critical in their tastes—men who could exercise judgment as to the form and colour of a work of manufacture. With regard to public sculpture, the lecturer said he could not but think of the small number of commissions that had been given within the last twelve months for public statues in this metropolis, or in the country at large—a number so small that it was undeserving of enumeration. How was it possible, under these circumstances, that we could maintain such a school of high sculpture as should appropriately influence our industrial sculpture? By saving a little public money in that respect, we starved our whole system of production at the head. We might doubt whether it was right to spend a thousand pounds upon a picture in the Houses of Parliament, because we did not trace the immediate connection of such picture with industrial pursuits; but there could be no doubt that we had a great demand for articles of sculpture which cost only a few pence or a few shillings. "Well," it might be said. "What does it matter? You sell the thing for a shilling. What does it matter whether a leg is too long, or whether an arm is out of proportion?" But, unhappily, while we sent our mis-shapen productions to a foreign market—the Frenchman, the Swiss, the Prussian, and the Belgian sends a better work—not, perhaps, merely for the same price as ours, but, it might be, at a lower price than ours. The foreign consumer did not say "It is only a shilling," but got the best article he could, and the English workman was left without pay as the ultimate result. Therefore it was deserving of the national consideration (even though we had an economical Chancellor of the Exchequer, and although we had a Chief Commissioner of Works who happened not to be a "market gardener" or any other class of "artist") whether it would not be a matter of economy to employ a portion of our public resources on sculpture. He (the lecturer) believed, too, that it was necessary to give commissions to a greater extent than we had been in the habit of doing for works in painting. The number of persons who could afford house room for statues was very limited as compared with those who could find room for pictures, and consequently the sculptor was much restricted in the number of his patrons. In some few cases, as in the case of the buildings under the Chairman's direction at South Kensington, and in the new Hall of Science, provision was made for public pictures and public statues, but unfortunately such provision was too generally neglected, although the public was quite prepared to appreciate any exertions in that way. But it was not sufficient to have developed a great institution at South Kensington—it was necessary to establish the same in every commercial town and industrial city. We must bring art instruction home to the thoughts of the population, which must be made to see its own deficiencies, and have the means provided to remedy them. With regard to architecture, fortunately we had made great progress, and had got to consider it worth while to put up handsome stone buildings instead of those long lines of dingy brick edifices which constituted such streets as Harley-street, and which were considered quite good enough when they were built—they were *houses*. The grandfathers of those who built Harley, Wigmore, and Wimpole streets had houses in which sculpture, carvings, and mouldings were conspicuous features. But a state of affairs came about under which it was thought quite sufficient to put up walls with holes in them in exact conformity with the provisions of the Window Duties' Act, and these things were put up in rows as private residences. The public buildings of the period suffered in the same way. By a concurrence of causes, that state of things had been, to a great extent, put an end to, and we had now something like an approach to monumental architecture. We had not expended money on public buildings without having attained some definite results. Mr. Clarke next briefly alluded to the various details by which our public buildings had contributed to the promotion of the public taste. The greater introduction of colour in various ways, and the use of marble, had been satisfactory, and the extension of gilding was a step in the right direction. All these means of introducing colour in a greater degree than hitherto in our public buildings formed a very essential contribution towards the improvement of the public taste, because, although we had been cultivating art for a considerable period, it had been *form* that had been studied rather than the advancement of *colour*. Colour was most material with regard to industrial productions, and with respect to textile fabrics was of more importance than form. In the porcelain manufacture, while form was of the utmost importance, so also was colour. Although the best of our own productions in this line had good form, they had been beaten by foreign works on the score of colour. He would also mention another art which had been included by Fergusson in his "Philosophy of the Fine Arts." He referred to gardening—not the "market gardening" before alluded to. If the right hon. gentleman the Chief Commissioner of Works had known that landscape gardening was a branch of the fine arts, he would probably have tabooed that as well as "market gardening." But landscape gardening had some claims to be considered a fine art, and had contributed to the adornment of the metropolis, and the late Chief Commissioner of Works was deserving of great praise for the care which he bestowed upon the subject. The lecturer referred with approbation to the small flower-beds which had been placed by Mr. Layard in front of the Houses of Parliament. He would say only a few words with regard to engraving, which was certainly the most popular method in which form could be placed before the population at large, and he was glad to see present a gentleman who had done something to promote a better system of engraving (Mr. Davenport), who gave a very valuable lecture recently at the Society of Arts on the various styles of engraving, and who had placed in the South Kensington Museum a collection of specimens of the various methods of engraving. He (the lecturer) would recommend his audience to take advantage of the opportunity offered by that collection to study not merely the present style of engraving, but the capabilities all styles possessed of affording a greater knowledge of art to the multitude. Without having traced the immediate connection of a particular branch of the fine arts with any individual industrial pursuit, he trusted that he had done quite sufficient to persuade his audience of the importance of the public culture of the fine arts, and he hoped that he had been enabled to convince them that, unless the public taste was cultivated, the public purse was likely to suffer. To carry out in our political and social economy the same great principles which the Author of Nature had adopted in the scheme of Providence there must be a proper appreciation of the beautiful as well as of the useful.

A discussion ensued, in which Mr. Dutton, Dr. Heinemann (Professor and lecturer at the Crystal Palace), Captain Britten, Mr. Henry Tidey, and the Chairman took part. The general tone of the discussion was corroborative of the views of the lecturer, who brought the meeting to a close by a brief reply to a few points raised in the discussion.

THE CONSERVATIVE LAND SOCIETY.—The post of architect and surveyor to the United Land Company, Limited, and to the Conservative Benefit Building Society, which was open to public competition owing to the decease of the late Mr. James Wylson, has been conferred by the two Boards of Directors on Mr. John Ashdown, formerly surveyor of the Orphan Working School and the Hammersmith Bridge Company and other public works. There were sixty-one candidates for the position.

BUILDERS' CLERKS' BENEVOLENT INSTITUTION.—The third annual meeting of this institution will be held at 14, Bedford-row, this evening. We are glad to see that this young institution is in a healthy condition, and we beg to congratulate Mr. Mullett and the Committee on their deserved success. Several propositions for alteration of rules will be submitted this evening.

Civil Engineering.

LIQUID EMBANKMENTS.

WHETHER we adopt the Neptunian or the Plutonic theory of the condition of chaos, it is in either case inferrable that all solid matter existed in a state of fluidity, or, at least, of semi-fluidity. Artificially, there are two principal methods of forming a solid mass. In the one instance it will result from the solidification of itself when in a liquid condition. In the other, it may be created by the gradual agglomeration and incorporation of its own particles. Cast iron illustrates our former meaning, and artificial fuel the latter. The main object in the construction of all embankments is the complete and thorough consolidation of every portion of it. Evidently this may be accomplished by either of the methods alluded to. Usually—it may be said always, in this country—it is the last-mentioned plan that is followed, but the relative state of humidity in which the material of which the bank is composed may be at the time of its formation, depends upon its nature, and some other fortuitous circumstances that may accompany it. Occasionally embankments are formed of materials almost of a perfectly dry and more absorbent character, but as a rule they are more or less in a wet and porous condition. Embankments constructed in marshy and swampy lands, or on the foreshore of rivers or coasts, have a large per centage of water in them when first made up, but still the process of formation consists, as in other examples, of heaping up small pieces of material, and allowing and assisting them to become desiccated and consolidated. All reclamation banks—that is, those which protect land enclosed or reclaimed from the sea—have to be very carefully watched for the first two or three years after their construction, as they always crack and split under the action of drying. These cracks are sometimes filled up by ramming solid or semifluid earth into them, but the best method to employ is to "sludge" them, as it is termed. This consists in filling pails with liquid mud, and pouring it into the cracks, and repeating the operation until they are completely filled up. If the cracks extend from the interior to the slopes, they must be first stopped superficially by good sized "spits" of clay, or the liquid would escape, and this process of sludging or fluid repairing of banks, bears some slight analogy to the formation of a bank by first constructing it in a fluid state, and then permitting it to solidify by contraction and consolidation. At the same time the modus operandi of the latter method is on a much larger scale and varies in many particulars.

The actual deposition of earth and other natural materials by the transporting power of water is continually taking place in the beds of rivers and streams, but until recently engineers have scarcely turned their attention to imitating this operation artificially. It is true that the principle was entrenched upon at the excavation of the Suez Canal. The dredges were furnished with long troughs, through which a constant stream of water flowed, and served to transport the excavated sand and earth. The most interesting example of this plan of constructing earthworks was made in the isle of Java by M. Siccama and communicated by him to the Society of Civil and Mechanical Engineers. The work to be done was the shifting of the stuff of a cutting sixty feet deep, and two thousand feet long, and the subsequent construction of a bank with the excavated material, which amounted to 157,000 cubic yards. With a strong gang of English navvies, this quantity, large as it is, would not have necessitated any extraordinary measures for effecting its removal and utilisation. But the case assumes a very different aspect, when coolies are substituted for railway labourers, accustomed to use the pick and shovel. Moreover, this is one of the instances where it is not possible to make numbers compensate for experience and dexterity. At Java, almost any number of coolies can be obtained, but in a work of this nature, it is not practicable to distribute more than a certain number over the space available for working. It appears that M. Siccama could not utilise the services of more than 1500 of the natives at his disposal, who, after the manner of oriental labourers, transported the earth in small baskets or panniers. Those who are acquainted with the details of Indian labour know that it is almost an impossibility to induce the natives to use the barrow. Men, women and children will work well and perseveringly in their own fashion, but they steadily refuse to do so after that of Europeans. The baskets in Java contain, on the average, about two cubic yards, and at the rate they could be filled and emptied, nearly a year would have been consumed in constructing the embankment. Under these circumstances the attention of M. Siccama was naturally directed towards the adoption of some other means calculated to ensure a somewhat speedier termination to the labour. He had remarked that the natives of the isle, in order to avoid the transport of the large quantities of solid earth required to form their banks, conveyed it to its destination in almost a fluid state through the agency of water carriage, in every sense of the term. This plan the engineer determined to imitate, and the general features of the operations are the following:—Canals and water channels are cut so as to collect all the surface drainage, and conduct it to the site of the excavation. Along the longitudinal axis of the cutting a canal is constructed, leading to the proposed embankment. The base of this is marked out in the ground, and the "toe" of the slopes defined by a row of faggots or fascines. Directly the rains commence a number of men are set to work to dig the earth along the top of the cutting, and pitch it into the canal. By mixing with the water it is rendered nearly fluid, and is borne along by the stream and deposited where required. The water escapes through the interstices of the fascines, while the nearly liquid mud is retained. As the accumulation proceeds, additional frames of fascines are constructed, which in their turn become filled, and so on; care is taken to preserve the form of the slopes when arranging the frames, and they are subsequently dressed and trimmed to the proper batter. Embankments made up in this manner are found to solidify in a very uniform and homogeneous condition. They are not liable to crack like newly-made banks, when constructed in the ordinary way, but have all the stability and consistency of ancient earthworks.

Some very valuable working details have been obtained from this method of raising banks. The quantity or volume of water required to transport a certain weight of solid matter held almost in a state of mechanical solution, varies, as might be expected, with the distance and the inclination of the channel of the stream. With an inclination of one in fifty, five cubic yards of water will transport one cubic yard of earth, to a distance of half a mile. The character of the work whenever the canals are dependent for supply altogether upon the rains, must necessarily be intermittent. So far as the operation of making the banks is concerned, this is an advantage, as it permits them to become gradually consolidated, whereas, were they made up *tout d'un coup* they might be for a long while wet and soft in the centre, although hard and firm on the surface. Under these circumstances they resemble a large casting which remains fluid in the middle, long after it has become superficially solid. A careful comparison of the relative cost of the two methods, which may be distinguished as the solid and the fluid, gives a balance in favour of the latter of four to one. It is not to be supposed that the fluid principle of constructing banks will ever supersede those in ordinary use, but at the same time it might be employed to great advantage in exceptional instances.

CIVIL AND MECHANICAL ENGINEERS' SOCIETY.—THE KING'S CROSS STATION ROOF.

(*Concluded from page* 105.)

IN continuation, Mr. Bancroft said:—One of our members, at the last meeting, desired to know if there is really a tie under the platform or not. Now, the horizontal thrust of this roof must be entirely taken by the heavy brick piers acting as abutments, but, in addition, the feet of the ribs are each secured to an anchor-plate built into the wall, and strongly fastened down by four bolts 3in. in diameter; and with a view to ensure perfect stability, a wrought-iron tie runs below the level of the rails across the platform, consisting of a $\frac{3}{4}$in. plate rivetted on to the bottom flange of one of the wrought-iron main floor girders.

It is often necessary to provide for the feet of true arched ribs to spring out a little during erection, in order to fit the supporting structure. This was the case in the Amsterdam Crystal Palace, the ribs of which were made to spring out in erection 2$\frac{3}{4}$in. This roof covered an area of 130ft. 8$\frac{3}{4}$in. by 64ft. 1$\frac{1}{4}$in., on each side of an oval dome, with an entire length of nave of 329ft. 1in. From the inside of this building the appearance of all the columns is similar.

The first tier of columns support the girders of the gallery, forming a sort of ornamental framework, with brackets at joints with columns.

The roof of this gallery being a strong wood structure, acts along the whole nave as a horizontal girder offering immense resistance to lateral pressure. About 15cwt. of wrought and cast iron were employed for each square of area covered with glass.

The large roof of the Crystal Palace, Sydenham, with a span of 104ft., covered with glass, required 12$\frac{1}{2}$cwt. of wrought and cast iron per square, while the smaller roof, with a clear span of 56ft., required 13cwt. per square of 100ft. The details of the two roofs in regard to their general arrangement are similar. The arched ribs of the roof throw a very small horizontal thrust upon their supporting structure, being constructed of a sufficient depth to act as a girder. There are two kinds of purlins employed—one 72ft. long and 3ft. deep, and the other 24ft. long and 6ft. deep, the latter serving to brace each two ribs of one pair together, while the former act as pure purlins supporting the intermediate rafters. A special arrangement was made for bracing the purlins sideways to these intermediate ribs.

The horizontal thrust of the main rib is transmitted by a cast iron framework to a system of columns connected by cast iron girders and diagonal bracing fixed to the ends of girders by keys. The whole of the supporting structure up to this frame is very rigid, for on one side below floor level there are cast iron girders fastened to brick foundations, and on the other side a fire proof flooring of brick arches. Thus the portion of the thrust arising from pressure of wind, snow, &c., which the rib does not sustain is easily overcome. The covering of the roof is on the ridge and furrow principle, and the rain water is conveyed to the drain pipes by hollow columns. Most of the girders and columns employed in the Crystal Palace are the same as those used in the Great Exhibition building of 1851.

The roof of the Winter Garden of the Dublin Exhibition covered a space 353ft. 6in. by 50ft. 6in., having a transept 33ft. 8in. wide by 50ft. 6in., and is covered with glass and Italian zinc of No. 14 gauge.

The thrust of the arched rib, the outline of which was semicircular, was resisted without the assistance of diagonal bracing, which although forming so great an obstruction, as everyone who has been to the Crystal Palace, Sydenham, must have noticed, had hitherto been generally adopted.

A flying buttress fixed to the column was here substituted for diagonal bracing, and the thrust of the main rib was conveyed to the second tier columns, which were firmly secured to small arched roof girders and connected to the first tier columns. The effect of this was to produce a transverse strain upon the columns, which had, therefore, to be increased in thickness at the sides which were thus exposed to the strain. As soon as the first tier columns were firmly fastened to the transverse bracket girders at the top, and to girders 1ft. 6in. deep under floor level, a complete rigid framework was produced, capable of taking the thrust of the arched rib without the assistance of diagonal bracing. The gallery floor was trussed by rods of wrought iron arranged diagonally in plan, thus causing the principal portion of the

permanent and moving load of the gallery to be immediately conveyed to the columns instead of being transmitted by the girders. The truss being thus arranged formed also a horizontal bracing to the galleries, and the girders were left to take up the thrust of the ribs. A rather original mode of ventilation was adopted in this roof. The main ribs carried in the centre cast-iron standards connected at the top on both sides by an angle iron which supported the covering. The space between these two angle irons was used for ventilation, and could be opened or shut by means of a valve, consisting of a piece of convex sheeet iron fixed to a rod running along the roof, and having a bearing in each of the cast-iron standards. Pulleys and balance weights were connected to this rod at various points by means of cords reaching nearly the floor of the building.

By this contrivance the opening or closing of the ventilator could be managed by simply turning the valve. The ridge consisted of a piece of corrugated zinc fixed on cast-iron supports, covering the whole apparatus. The buttresses, columns, gutters, and girders throughout the building were entirely of cast iron, but the arched ribs of the main roof were of wrought iron, and weighed 2¼ tons each. The purlins were also of cast iron, the webs of which were ornamentally perforated, the perforations being glazed, and the joints of the purlins chipped. About 9¼cwt. of wrought and cast iron were required for each square of area covered.

The roof of the Royal Albert Hall is domical. The plan of the building is oval, with four centres, the major and minor axes inside the walls being 219ft. 4in. and 185ft 4in. respectively. The top of the lantern surmounting the roof is about 150ft. from the floor level. The roof consists of light wrought ironwork, having a wrought iron flanged curb resting on the top of the wall about 120ft. high from Kensington road level. Upon this curb plate cast iron shoes are fastened by keys, from which the main curved ribs spring. The ironwork is so arranged that the curved principals are capable of carrying their own weight, together with the weight of seven rows of purlins between them and the rafters of roof and ceiling. The thrust thus bearing on the main ribs is taken by the main wall plate, and the strains on these ribs are adjusted by means of wedges between the wall-plate and the foot of each rib by the slackening or tightening of which the whole of the thrust is brought upon these curved ties resting on the wall. The top flange of the rib acting as an arch communicates the strains produced under every variety of loading, pressure of wind and snow, &c. So the wall-plate and these ribs are retained in their position by means of the curved ties and bracing. The whole building is estimated to cost about £200,000.

In conclusion I should like to say a few words on the iron and glass roof covering the winter garden of the Leeds Exhibition. This roof presents the appearance of being constructed on the arched principle, but more strictly speaking, is on the principle of a dome. The arrangement here adopted for taking the horizontal thrust was entirely novel. The internal dimensions of this structure are 151ft. by 63ft. 6in. The infirmary walls surrounding the winter garden do not sustain any portion of the outward thrust. The main roof is really carried by the four corner rafters or hip ribs, which, having thus to perform the chief portion of the work, are made stronger than the ordinary ribs. The roof is supported on twelve columns 32ft. high by 24ft. 10in. apart, six on each side of the building, leaving a space of 37ft. 3in. between the rows and an aisle on each side 13ft. 1½in. wide. These columns are surmounted by very handsome capitals, from which spring ornamental spandrels to a lower frame of lattice girders connecting the tops of the columns firmly together, and forming a rectangle in plan 124ft. 2in. by 37ft. 3in. At each column similar spandrels to those forming arches between the columns are placed over the side aisles, and are surmounted by cast iron rafters with perforated webs inclined at an angle of 30° from the brick wall of the infirmary to the level of the top of columns.

The main arched ribs, which are also of cast iron, with perforated webs, are bolted to this bottom frame of lattice girders, and at the top to a similar rectangular frame 99ft. 4in. by 12ft. 5in. This top frame is braced by cross pieces of cast iron 12ft. 5in. apart, and is thus rendered exceedingly rigid. The weight of the upper frame, as well as the weight of the greater part of the lower roof, is transmitted to the corner ribs, which, in return, transmit a horizontal thrust upon the upper frame. The lower frame, acting as a tie, has now to receive this horizontal strain on the bottom of the ribs. The load on the intermediate ribs, although producing no outward thrust, is sustained partly by the corner ribs, partly by the upper and lower lattice girders, and partly by the intermediate columns. Both tiers of girders are 5ft. deep, and the vertical distance between them is about 15ft. 2in. There are two rows of cast iron purlins connecting the main ribs, and a single row between the aisle rafters, halfway between their ends. Two rows of moulded cast iron gutters are fixed at the base of the arch pieces or spandrels, at their junction with the lower girders, and also above the aisle rafters against the brickwork forming the walls of the central hall. About 150 bars of iron were employed. Messrs. Handyside and Co., of Derby, were the contractors. The floor level is 60ft. 6¼in. from the summit of the ridge piece. Sashes are made to open, swinging horizontally for ventilation. The wooden sash frames for glazing are of a similar section to those employed in the St. Pancras Station. Exclusive of glazing, which may be estimated at £5 per square approximately, the total cost of this central hall was £3000. The whole of the construction and design of this iron building was intrusted by Professor G. Gilbert Scott, R.A., the architect of the Infirmary building, to Mr. R. M. Ordish, who was also engaged upon the various other structures, the peculiarities of which I have been endeavouring to lay before you in a few words this evening, thinking that it would not be uninteresting to compare them with the roof now under discussion.

The foregoing particulars were well illustrated by tracings and photographs of the principal roofs referred to.

INSTITUTION OF CIVIL ENGINEERS OF IRELAND.

A MEETING of this institution took place on the 9th instant, in the Museum Buildings, Trinity College. Mr. John Ball Greene, Commissioner of Valuation, presided. The chairman delivered the annual address, and in the course of his observations alluded to the kind assistance he had experienced during his term of presidency from the officers and members of the institution, which latter he described as maintaining the reputation it had sustained for the last thirty-four years. He then referred to the various papers and scientific matters brought before the institution during the year.

JAPANESE ORNAMENT.

IN THE BUILDING NEWS of June 11th, 1869, we published, with an illustration, some remarks on Japanese ornament; this week we give some further examples, taken chiefly from an old folding screen apparently of considerable antiquity, and without a trace of the "European Market" style of drawing, which is gradually disfiguring modern Japanese work, or at least that imported into England.

The figure, with the arrangement of the draperies, is very happily conceived and worked out, and, together with the ornament generally, is painted on gilded and stamped lacquer work.

It is beyond our province as architectural journalists to trespass on the borders of fashion, or we might suggest that certain conspicuous novelties, which we need scarcely particularise, of modern female attire are suspiciously like copies, but very bad copies, of this Japanese lady's costume. May we venture to think that in this matter of dress, as well as in the more stable forms generally of decoration and design, the importation of a genuine Japanese artist might, should he be taken in hand by the right man, infuse a freshness and subtle combination of colour and design into our decoration as pleasing as it would be novel? O. W. D.

TREATMENT OF SEWAGE.

AT a meeting of the Committee of the British Association on the Treatment and Utilisation of Sewage, at which there were present R. B. Grantham, Esq., C.E., F.G.S. (in the chair); Professor Marshall, F.R.S.; J. Thornhill Harrison, Esq., C.E.,; J. Bailey Denton, Esq., C.E., F.G.S.; W. Hope, Esq., V.C.; and Professor Wanklyn, F.C.S., the Honorary Secretary presented the list of subscriptions from the various towns contributing towards the expense of a practical and comprehensive inquiry into the treatment and utilisation of sewage. He reported that he had addressed the circular to 663 Corporations and Boards of Health, and received replies from 245. The following towns subscribed the sums placed opposite their names:—

	£	s.	d.
Manchester	100	0	0
Halifax	30	0	0
Plymouth	30	0	0
Bath	21	0	0
Cardiff	21	0	0
Exeter	21	0	0
Greenock	21	0	0
Hanley	21	0	0
Ipswich	21	0	0
Oxford	15	15	0
Burslem	10	10	0
Cambridge	10	10	0
Coventry	10	10	0
Devonport	10	10	0
Dewsbury	10	10	0
Doncaster	10	10	0
Durham	10	10	0
Gloucester	10	10	0
Hereford	10	10	0
Keighley	10	10	0
Longton	10	10	0
Macclesfield	10	10	0
Maidstone	10	10	0
Paisley	10	10	0
Reading	10	10	0
Shrewsbury	10	10	0
Torquay	10	10	0
Wakefield	10	10	0
West Derby	10	10	0
West Hartlepool	10	10	0
Derby	10	0	0
Kendal	10	0	0
Todmorden	10	0	0
Windsor	7	7	0
Abergavenny	5	5	0
Abingdon	5	5	0
Balsall Heath	5	5	0
Bradford	5	5	0
Bridport	5	5	0
Bromley	5	5	0
Carlisle	5	5	0

	£.	s.	d.
Cheshunt	5	5	0
Cottingham	5	5	0
Dartford	5	5	0
Daventry	5	5	0
Eastbourne	5	5	0
Ely	5	5	0
Enfield	5	5	0
Eton	5	5	0
Fenton	5	5	0
Frome	5	5	0
Gainsboro'	5	5	0
Guildford	5	5	0
Harborne	5	5	0
Hertford	5	5	0
Lichfield	5	5	0
Louth	5	5	0
Malvern	5	5	0
Newport (Hants)	5	5	0
Northam	5	5	0
Pennington and Westleigh	5	5	0
Penzance	5	5	0
Ripley	5	5	0
Rusholme	5	5	0
Sheerness	5	5	0
Stoke-on-Trent	5	5	0
Swaffham	5	5	0
Toxteth Park	5	5	0
Walker	5	5	0
Walton-on-the-Hill	5	5	0
Waterloo	5	5	0
Wavertree	5	5	0
Wellingborough	5	5	0
Weymouth	5	5	0
Crewe	5	0	0
Ormskirk	5	0	0
Ware	5	0	0
Wells	5	0	0
Littlehampton	3	3	0
Atherton	2	2	0
Stretford (Lanc.)	2	2	0

The subscriptions amount to £786, exclusive of the £50 given by the British Association. Of those towns and districts which replied to the circular and did not contribute, 25 deferred their decision for consideration, and 23 merely acknowledged the receipt of the application without any intimation as to their intentions, while the remainder, amounting to 116, refused on various grounds, some because they thought the inquiry ought to be conducted at the expense of the country generally, and some because, though they approved of the inquiry, they were too poor to contribute. Others, also approving of the inquiry, came to the conclusion that they had no legal authority for contributing, while there were three only that disapproved of the inquiry. A few declined on the ground that sewerage works already existed in their districts with arrangements for the utilisation of the sewage. 418 towns and districts made no response at all. The Metropolitan Board of Works declined to contribute on the ground that the Act of Parliament under which it was constituted the representative body of a population equalling one-sixth of that of the entire country does not contemplate such a use of ratepayers' money.

The committee, after a careful consideration of the matter, was of opinion that the amount already subscribed was sufficient to justify the commencement of the inquiry, but unless a larger number of places joined in contributing, the inquiry would not be sufficiently extended. It was therefore determined first to forward to every town and district, subscribing or not, the list of subscriptions, with this statement of the intentions and views of the committee, and, secondly, to request the authorities of the subscribing towns to state the nature of the difficulties under which they severally suffer.

CONDEMNED HOUSES.—We learn from the report of Dr. Whitmore, the Medical Officer of Health for Marylebone, that for the past month the inhabitants of certain miserable houses in York-court, which were condemned some time ago, under the Artisans' Dwellings Act, by the vestry as unfit for human habitation, have taken the affair into their own hands, and have busied themselves in ripping up the flooring, tearing down the shutters and window sashes, and removing the doors, and even the laths from the walls and ceilings, for the purpose of providing themselves with fuel during the late inclement weather. Three of the houses are, it is stated, now entirely gutted, and are no longer inhabited, while the remainder of them, although still tenanted, are in the utmost state of dilapidation.

Building Materials and Appliances.

ON THE STRENGTH OF PORTLAND CEMENTS.

AT the last meeting of the Liverpool Architectural Society, Mr. J. Bouit gave the results of some experiments on the strength of specimens of Portland cements by various makers, as follows :—

Results of experiments on various Portland cements, 23rd December, 1869, supplied by Messrs. White and Sons, Messrs. Knight, Bevan, and Co. and the Liverpool or Mersey Cement Company.

The first series of experiments were at the New Hotel, Lime-street Station, and the test was a number of white facing bricks upon bars of cement, each bar 2½in. by 2½in., with a clear bearing of 2ft. ; 6 bricks weighed 52lb.

In all the specimens of each maker, except Knight, Bevan, and Co., the bars were cast on 7th December, and dried in the air ; the specimens of Knight, Bevan, and Co.'s cement were cast on 8th December, and also dried in the air.

1. White and Sons' neat cement broke with clean fractures, showing a close grain, with the weight of 27 bricks = 234lb. ; a piece 4½in. long broke out of the middle of the bar.

2. Knight, Bevan, and Co.'s neat cement broke with a single fracture, showing an open grain, with the weight of 22 bricks = 190⅔lb.

3. Liverpool Cement Company's neat cement broke with a clean fracture, showing a close grain, with lhe weight of 32 bricks = 277lb.

4. White and Sons' sand and cement, 1 to 1, broke, showing a faulty texture at the fracture, containing small lumps of sand, with the weight of 14 bricks = 121⅓lb.

5. Knight, Bevan, and Co.'s, in equal proportions, broke, showing a similar texture, with the weight of 14 bricks = 121⅓lb.

6. Liverpool Cement Company's, in equal proportions, broke, showing less faulty texture, the materials better mixed, with the weight of 23 bricks = 199⅓lb.

7. An extra specimen of the Liverpool Company's neat cement, cast 14th December, broke, with a clean fracture, with the weight of 41 bricks = 388⅔lb.

8. Another extra specimen, cast the same day, of sand and cement, in equal ratio, broke with the weight of 21 bricks = 182lb.

At the works, Seacombe, the test was resumed the same afternoon with a lever on specimens cast, as for the Government tests, with shoulders near each end, for the purpose of showing the resistance to tension :—

1*a*. White and Sons' neat cement, dried in the air, and cast on 7th December, was torn asunder by 458lb.

2*a*. Knight, Bevan, and Co.'s, cast on 8th Dec. was torn asunder by 578lb.

3*a*. Liverpool Cement Co.'s, cast 7th Dec. was torn asunder by 718lb.

4*a*. Maker's name unknown, but supplied by Mr. Atkins, cast 10th December, was torn asunder with 668lb.

5*a*. An extra specimen from the Liverpool Co. cast 14th December, was torn asunder with 718lb.

The following specimens were cast on the several dates given above for the respective makers, were placed in water the following day, and taken out of the water on the morning of the trial.

1*b*.	White and Sons	torn with	278lb.
2*b*.	Knight, Bevan and Co.	,,	528 ,,
3*b*.	Liverpool Co.	,,	738 ,,
4*b*.	Atkins...	,,	658 ,,
5*b*.	Liverpool Co.'s extra...	,,	698 ,,

The latter specimen was slightly injured when taken out of the mould.

The following specimens, half sand and half cement, were cast on the dates previously given, and dried in the air :—

1*c*.	White and Sons	torn with	208lb.
2*c*.	Knight, Bevan and Co.	,,	408 ,,
3*c*.	Liverpool Co.	,,	688 ,,
4*c*.	Atkins	,,	498 ,,

the fracture in the latter showing a pebble of large size in comparison with the sectional area of the specimen.

5*c*. Liverpool Co.'s extra ...torn with 548lb.

The following were of sand and cement, in equal proportions, and kept in water, as in series *b* :—

1*d*.	White and Sons	torn with	208lb.
2*d*.	Knight, Bevan, and Co.	,,	278 ,,
3*d*.	Liverpool Co.	,,	488 ,,
4*d*.	Atkins.....	,,	318 ,,
5*d*.	Liverpool Co.'s extra	,,	528 ,,

The above were prepared on the works of the Hotel, Lime-street station, under the superintendence of Mr. John Kneale, foreman to Messrs. Haigh and Co., and had been in his charge until tested. The following were prepared at the works in Seacombe, at the several dates affixed, as stated by Mr. Walker and his assistants :—

1*e*. Cast seventeen days since, "not more," and kept in water, torn asunder with 508lb.

2*e*. Cast 15th August, air dried, torn with 898lb.

3*e*. Cast 16th September, air dried, torn with 698lb.

The weight required to tear asunder the several specimens of neat cement, per square inch of section, was—

1*a*.	White and Sons	73·28lb.
2*a*.	Knight, Bevan, and Co	92·48 ,,
3*a*.	Liverpool Cement Co.....	114·72 ,,

The weight required to fracture each cement neat, per square inch of section, was—

1.	White and Sons.....	37·44lb.
2.	Knight, Bevan, and Co.	35·00 ,,
3.	Liverpool Cement Co.	44·48 ,,

Weight required, per square inch, to fracture the undermentioned stones, sectional area 4 by 4 = 16 inches, and clear bearing 2ft. :—

Hollington	63.75lb.
Old stone, Exchange Buildings Caryl-street.....	60·00 ,,
Everton, St. Domingo	55·56 ,,
Runcorn	42·00 ,,
Warwick (near Bradford).....	117·62 ,,
Minera (Berwig)	69·00 ,,

PARLIAMENTARY NOTES.

STREET TRAMWAYS IN THE METROPOLIS.—On Thursday week, in answer to a question put by Mr. W. H. Smith, Mr. Shaw Lefevre stated that the whole question was under the consideration of the Board of Trade, and he hoped in the course of a few days to be able to make a statement with reference to the numerous Bills now before the House relating to metropolitan tramways. In the meantime, the second reading of those Bills had been postponed.

THE SUBWAY TO PALACE YARD.—On Monday evening Mr. Locke King asked the First Commissioner of Works why the subway at the foot of Westminster-bridge had not been connected with the Embankment at Cannon-row, and whether it was now intended to be kept for the sole benefit and exclusive use of the Metropolitan Railway.—Mr. Ayrton said the subway was a project suggested some years ago for the purpose of enabling members of Parliament to pass quietly from Parliament-street into Palace-yard. But since it was first proposed, the Metropolitan Railway Company had been carried to Westminster-bridge, and the Thames Embankment had been constructed. Ground on the opposite side of New Bridge-street, which had been formerly in the possession of the Office of Works, had been sold to the Metropolitan Railway Company, and therefore there was no egress from the subway on that side, except to the company's station. The company had undertaken to afford an egress at their station. As to the connection of the subway with the Embankment, the matter was, he believed, under the consideration of the Metropolitan Board of Works, but until they had come to a final determination on the subject he could not give the hon. gentleman a final answer. As to any further approach or egress on the land of the railway company, they naturally said that if any land were to be taken from them they must be paid for it.

NEW COURTS OF JUSTICE.—Mr. Headlam asked the First Commissioner of Works whether he would undertake to lay before the House the plan of the proposed Courts of Justice as soon as the same was settled, and before any contract for executing the work was made.—Mr. Ayrton said he should be happy to lay the plans on the table as soon as they were ready.

SUBURBAN COMMONS.—Mr. Cowper-Temple on Tuesday evening, in moving for leave to bring in a bill to provide for the improvement, protection, and management of commons and waste lands near cities and towns in England, said the object of the measure was to withdraw from the operation of the Enclosure Act of 1853 all commons or open spaces within a definite radius of the metropolis. Leave was given, and the bill was read a first time.

OPEN SPACES.—Lord Otho Fitzgerald appeared at the bar with her Majesty's reply in respect to the address on Epping Forest, in which she expressed her desire not only to maintain the rights of the Crown, but to preserve all open spaces.

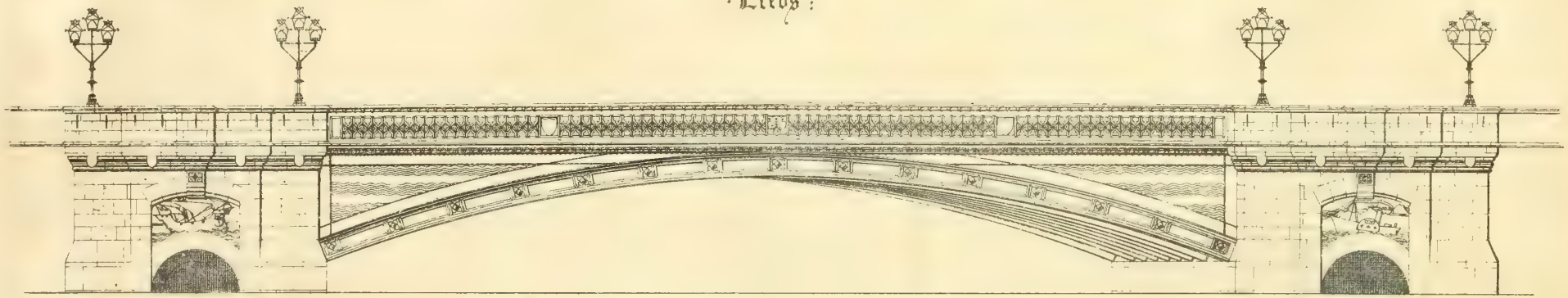
CHELSEA BRIDGE.—The position of Chelsea Bridge came under the consideration of the House of Commons on Tuesday. Mr. Peek and Mr. W. H. Smith advocated a resolution declaring that the toll now levied on that bridge ought to be abolished, and in this proposal they were supported by Mr. Brodrick and Mr. Cubitt. Sir P. O'Brien and Mr. Anderson, however, objected to a benefit being conferred upon a portion of the metropolis at the expense of the taxpayers of the country, and the motion being vigorously opposed by Mr. Ayrton, who prolonged his explanation until he excited cries of "Divide, divide," it was defeated by a majority of 141—162 to 21.

DESIGN FOR THE PROPOSED BRIDGE, LEEDS.

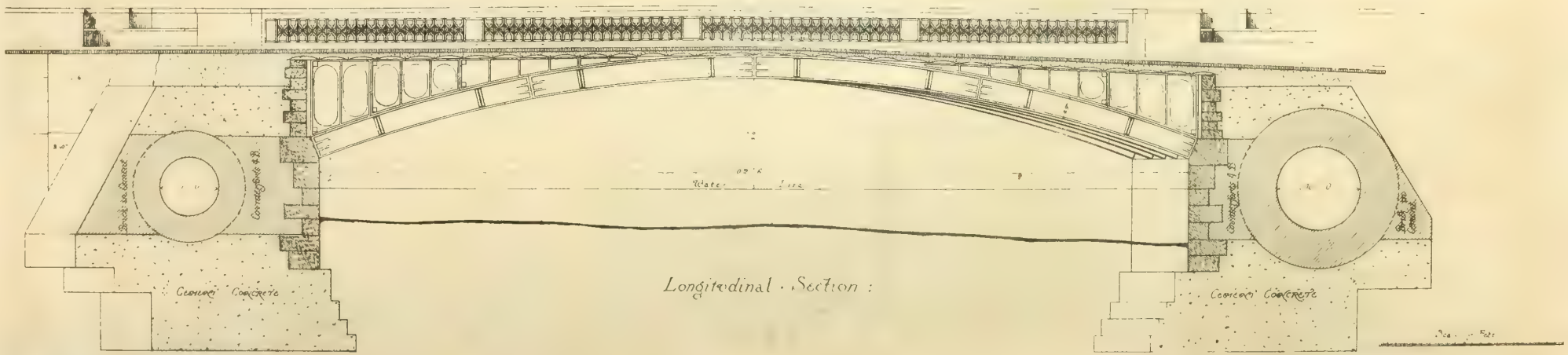
WE this week lay before our readers one of the designs sent in at the late Leeds Bridge competition. The conditions governing the competition fixed the ratio of rise to span, and at the same time insisted that circular culverts of 7ft. and 10ft. in diameter, should pass through the east and west abutments respectively, with their centre lines in the positions and at the levels shown in the plates. This much in explanation of what might otherwise be taken for a very curious exercise of taste. In the design before us, each of the abutments consists of one mass of cement concrete (1 Portland cement, 4 gravel, 2 sand), cased with masonry, consisting of smooth hammer-dressed Bramley Fall stone, cornices of Portland, and plinth of granite. Immediately behind each main rib are counterforts of brickwork, three feet thick, laid with their courses at right angles to the thrust of the arch ; these run the entire length of the abutment, and through them pass the culverts. The concrete and brickwork are tied together, throughout, with hoop iron, at 12in. intervals, both longitudinally and transversely, so as to make the whole abutment one homogeneous mass. The main ribs, 9 in number, are of cast-iron, 2ft. 9in. deep, each cast in four lengths ; they are very thoroughly stiffened by cross bracing, &c. The roadway, which is carried by Mallett's well-known buckled plates, consists of granite setts, six inches thick, overlaying a layer of asphalt composed of tar and sand. The leading dimensions are—width between parapets, 60 feet, made up of two footpaths, 12ft. each, and roadway 36ft. Span on square, 100ft. ; on skew, 102ft. 6in. The bridge is calculated to carry safely a live load of 240lbs. per square foot on the roadway, and half that amount on the footpaths. The tender for the whole work, without extras, sent in by a well-known firm, was £15,776 ; this included the removal of the existing bridge, the building of several hundred feet run of heavy brick retaining walls, as well as the erection of a temporary bridge, together with cofferdams and everything required. The design of which the above is a brief description was sent in by Messrs. W. L. Coke, and G. F. Roper.

THE TECHNICAL INSTRUCTION OF HOUSE PAINTERS.—The society that was formed some months ago under the title of "The London House Painters and Decorators Technical Instruction Association," and having its headquarters at the London Artizans' Club, 73, Newman-street, continues its classes at the Marylebone School of Art in Bolsover-street, and, considering the very depressed state of the building trades, the association has been fairly supported. On Wednesday week the members of the association adjourned to the large hall of the German Club in Foley-street, to hear a lecture by Mr. John G. Crace on "Art Training." Mr. Edward Hall, F.S.A., architect, was in the chair. Mr. Crace's high position as a decorative artist brought together a large audience. At the conclusion Mr. Crace kindly assented to a suggestion to print his lecture ; and the meeting was addressed by Mr. Lamport, Mr. Shipton (the secretary), and the Chairman—the importance of diligent study, and of drawing as a qualification, and the superiority of decorative art on the Continent, being generally dwelt upon.

DESIGN FOR PROPOSED BRIDGE OVER THE RIVER AIRE at Leeds:



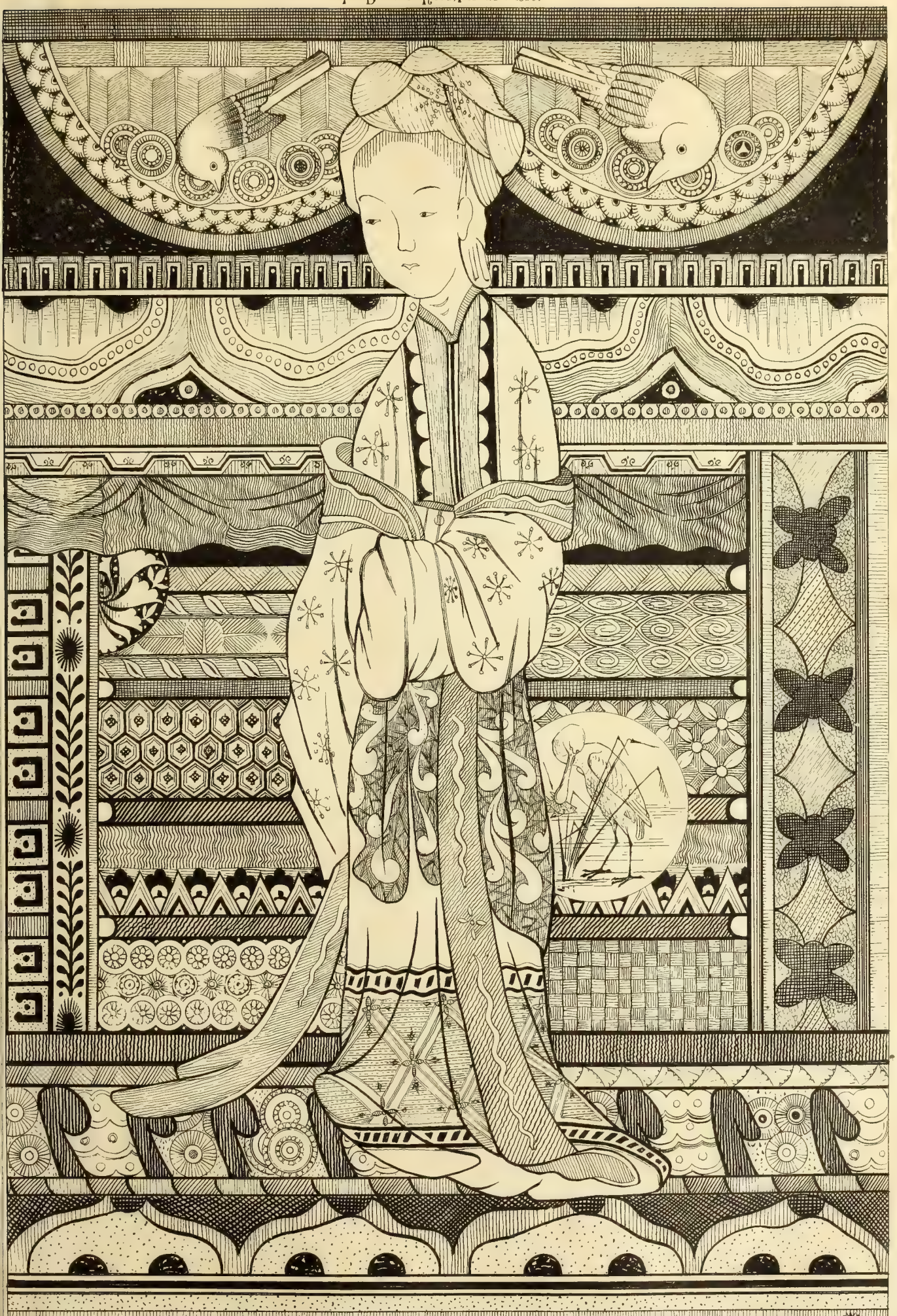
Elevation of Bridge:



Longitudinal Section:

Designed by Messrs W. Langton Cole & G. Freeth, Robert London 1869:

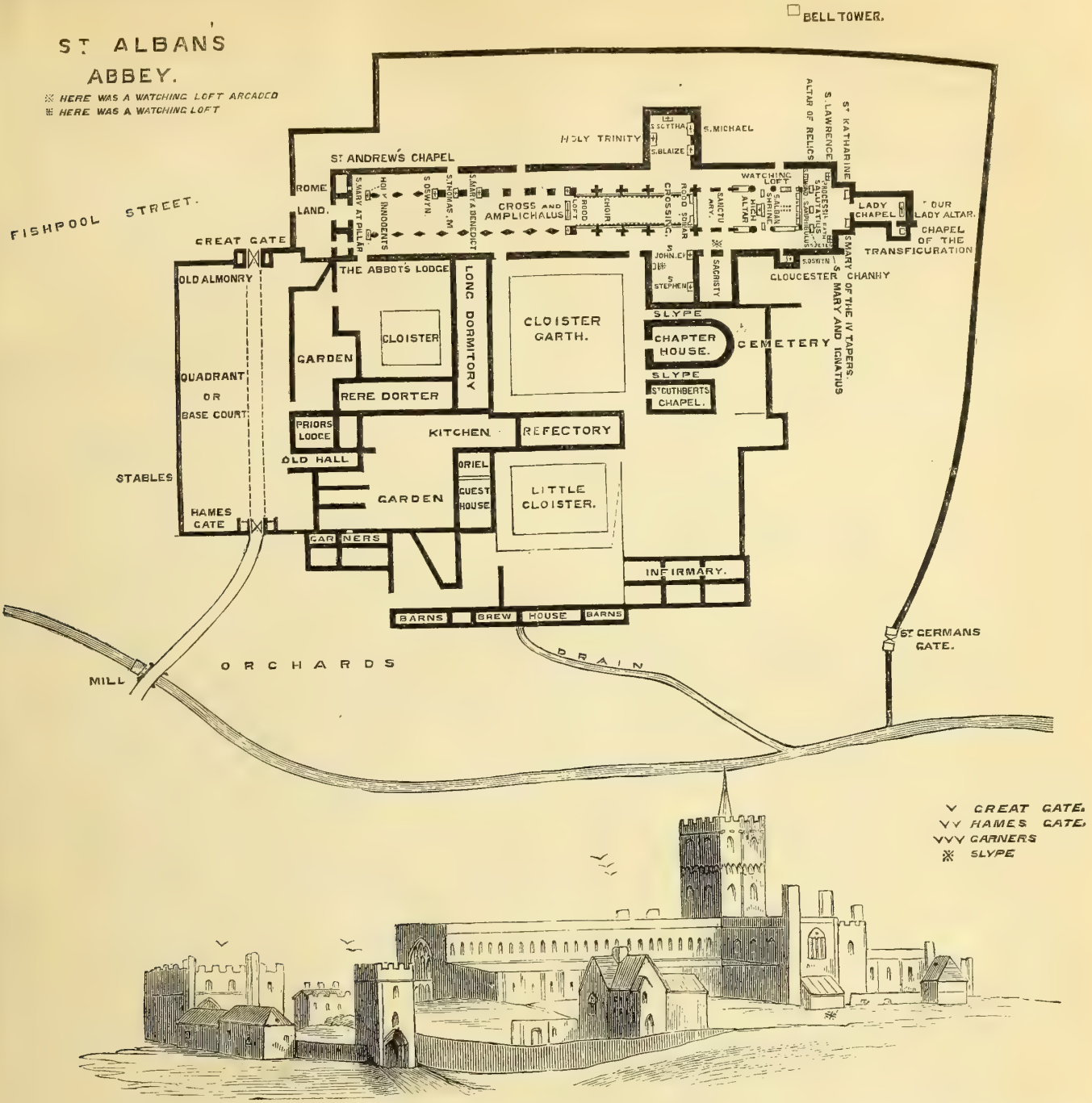
Photo Lithographed by Whitehead & Bale London.



JAPANESE ORNAMENT: DRAWN BY ALFRED POWERS.

Owen W Davis del et lith

Printed by Whiteman & Bass



S. ALBAN'S BENEDICTINE ABBEY.

SOME years since, I was able for many consecutive weeks to spend many hours daily in the glorious minster of S. Alban. My interest in it has never abated, and I have collected from various sources printed or in manuscript, illustrations of its history and arrangements. Some details I at a more date recent gave to the Architectural Association in a *viva voce* lecture. The plans (and they are but sketches) which I have consulted in the British Museum, made by Stukeley, 1721, a second in 1719, another in 1791, one by Esex, a fifth dated 1766, a sixth by Vertue, and seventh 1819 have been compared with the works of Matthew Paris, notices in the Book of Life, and MS. histories. They widely differ from the account, and the plot supplied by Mr. Newcome, who approached a difficult subject when archæology was in its infancy, and Fosbrooke its first pioneer. The misapprehensions of later writers I have not indicated, as it is most ungenerous to disparage men who did their best with little light to guide them. At Battle I had to recast the plan, as it was popularly assigned in its various parts, and I am happy to find that my suggestions have been accepted. I can only trust that in the following paper I shall be equally fortunate. I should add that only a fragment of the north wall of the cloister and the great court gate now survive of the grand mass of conventual buildings to which the nearest parallel is offered by those of Gloucester. I have given full details of the inner life of the Benedictines in a translation of the Custumal of Westminster, and of the different buildings in my "Sacred Archæology," at considerable length; it would therefore be superfluous to attempt here an unsatisfactory, because necessarily a compressed repetition, which would moreover occupy space devoted now to new and local matter.

Rood Loft.—In the time of Abbot William, 1214-35, Walter de Colchester, Sacristan, painter and sculptor, completed the rood loft in the centre of the church, with the great cross, Mary and John, and other sculptures and beautiful structures.

The Abbot translated the shrine of S. Amphibalus behind the high altar near the shrine to a place where there is an enclosure by an iron wall and lattice work, and built an altar with a table and super-altar (or retable as it must mean here), painted richly. Within this closure on Sundays at High Mass a station was made by the procession. Thomas, 30th Abbot, translated it from behind the altar of S. Hugh, 1349-96, This altar was dedicated to SS. Cross and Amphibalus by John, Bishop of Ardfert, its former dedication being that of Holy Cross, consecrated by Godfrey, Bishop of S. Asaph, 1151-66, and the great cross over the altar was also dedicated by him. The old Rood, 1214-35, was removed over the altar of S. Blaise.

Nave Altars.—Three altars below the Rood were consecrated by Horrensis, Bishop of Hungary, 1401-20; they were in a row in the body of the church, and were dedicated to—

1. S. Mary, S. Benedict, Apostles and Martrys.
2. S. Thomas, Martyr.
3. S. Oswyn, which was renewed by the industry of Thomas Houghton, Sacristan, who painted the rood Mary and John.

S. Andrew's Chapel, consecrated by Hervey, Bishop of Ely, adjoined the north-west side of the church and had a chancel, and three altars dedicated to—

1. St. Andrew.
2. S. Mary.
3. S. Nicholas.

[An altar of SS. Nicholas and Blaise in S. Alban's Church, was consecrated by Gilbert, Bishop of Limerick, 1151-66. Gesta 1, 148.

It had its own custos. Near the door to it was an image of S. Richard, Bishop of Chichester.

Hervey, Bishop of Ely, consecrated the altar S. Mary Magdalene.

At York, there was a chapel of the Holy Sepulchre and all Angels in a similar position, and Ely had another adjunct of this kind.

1151-68. The Sacristan roofed the greater part of the church with lead, and whitewashed it within and without.

South Aisle.—Here was the iron closure of S. Mary at the pillar facing the small door, leading

to the Abbot's chapel. It was consecrated on S. Vincent's Day, by Hugh, Bishop of Durham. Over it were the images of S. Mary, S. Mary Magdalene, and a retable with S. Mary's joys. A fraternity of S. Alban attended this altar. Beyond it was the door of the forensic parlour. A chapel of the Holy Innocents is mentioned 1151-68 *in anteriori parte ecclesiæ*, as consecrated by Ralph, Bishop of Rochester.

In the South Nave Aisle, adjoining the choir was an arch under which Robert the Hermit was buried, opposite to it was an aumbry for valuable books made and painted by Abbot Simon, 1166-83.

Transept, South Wing.—On S. Paulinus Day, 1323, whilst a great multitude was present, two great columns of the south wing of the transept, owing to a failure in the foundations, fell. Within an hour the wooden roof fell, and injured the shrine of S. Amphibalus, and the cloister adjoining the transept.

The south arm was rebuilt and roofed by Abbot Michael, 1435-49, the works having been going on during 20 years. Adam de Vankastre, Sacristan.

Hugh, Bishop of Damascus, consecrated three altars in the newly-erected part of the church to S. Mary, S. Thomas, S. Oswyn, S. Benedict, &c., with their images.

THE CHURCH.

Abbot William, 1214-35, completed the west front, and the tower received an octagonal lantern. Abbot Paul, in 1115, had the church dedicated, which he had completed with the conventual buildings.

Here were two chapels and altars.

1. *S. John Evangelist*, with an image of S. Martin.

2. *S. Stephen*, with the image of S. John Baptist. At this altar King Stephen granted the remains of Kingsbury to Abbot Robert de Gorham, sen. Burials are mentioned opposite this chapel, near the wall adjoining the chapter house, it was therefore on the south side ; and near the cemetery or chapter-house of the Monks was the image of S. Mary, called the "Beautiful."

In 1320-60, when the roof fell, it is said to have injured the shrine of S. Amphibalus.

Transept, North Wing.—The north wing of the transept, in the front to the east, were the altars *S. Michael and All Angels*, with a window containing the story of S. Katherine, set up by John Hatfield, Doctor in Decretals and Archdeacon, where there were images of SS. Katherine and Michael, and a procession was made at Michaelmas. Robert Newton gave to the new window xls. in 1421.

There were three altars also here:—

1. *S. Scytha*, where were the image of S. Apollonia and a table with images of S. Mary, S. Edmund kneeling, S. John Baptist, S. John Evangelist, and Confessors and S. Wulstan. It adjoined the north choir aisle.

2. *Holy Trinity*, with images of SS. Rhadegund and Sebastian. Here was a guild of 200 men and women, to whom the priest distributed clothes, shoes, and necessaries bought with the offerings.

3. *S. Saviour, S. Mary, S. Laurence*, and *S. Blaise*, erected by W. Wintreshull, monk, and consecrated by Bishop Godfrey, of S. Asaph, 1155-61. It is mentioned as S. Blaise's Altar 1214-35, and had over it the old rood from the nave and the ancient Mariola, but was consecrated at S. Mary's altar at this time by John, Bishop of Ardfert, and the transept ceiled with wood over it.

Abbot Robert made a beautiful image of S. Mary, 1151-66, over the altar of S. Blaise. A new one was made by W. de Colchester, 1214-35. The old one was set up over the Mary Mass Altar, in the north part of the church, but the wax taper, garlanded with flowers, was lighted on festivals before the new Mariola, in the south part of the church, which was consecrated by John, Bishop of Ardfert, and over it was set the old beam which had stood above the high altar.

A bell called Mary was also ordered to be rung three times a day, to call the celebrants to their office.

THE CHOIR.

Abbot Hugh, 1308-26, began to rebuild the choir with the king's help, who gave wood and money. Geoffrey was the master of the works in the choir.

In the time of Robert of Sens, 18th Abbot, 1151-66, Ralph, Bishop of Rochester, consecrated SS. Mary's and Ignatius' altar on the south side of the church, in regard to the high altar.

The South Aisle (deambulatorium) *of the Presbytery* led to the altar of S. Mary of the four tapers, where the mass for the dead was sung.

Wheathampstead, at a cost of £74, built the chapel over against the shrine ; a wooden fabric for the gospeller, at the west end of the church, cost £43, and a pair of choir organs, £17.

For making a like chapel on the south side of the church, over against the shrine, with a window, £54. This was the Gloucester chantry ; choir, for fabrica lignea, for the organs, and reading the Lections, £44 3s. 4d.

The North Aisle of the Presbytery.—Here was the altar of S. Katherine and Michael. In it also a burial occurred between the bell tower and the sacristy (of the lady chapel) near the bells ; and mention is made of the Leaning crucifix ; and of the altar of S. Laurence near the bells. The image of S. Laurence with that of S. Grimbald had been taken from S. Laurence chapel, in the old almonry which had been destroyed in the construction of the great gate, in the infirmary, and was set over the holy cross altar near the bells ; the original dedication of this altar was therefore changed at this time, and two altars on the north side of the church under the rood solar (solario crucifixi) were consecrated by Hugh, bishop of Damascus, between 1435 and 1449. A treasury in the 13th century adjoined the church.

Suspended over the high altar, 1166-83, was a vessel of gold jewelled, in which was the Eucharist. It had a silver crown, 1151-66. On the right hand of the altar, on the wall, was a shrine of S. Amphibalus.

Between the high altar in the presbytery, and the enclosures round the shrine, were three altars :

1. S. Alban at the head of his shrine.

2. The altar of reliques, built in honour of S. Hugh. Robert Thynoth, the shrine-keeper, collected these relics.

3. The salutation, or S. Wulstan's, consecrated 1214-35. It adjoined S. Oswyn's, eastward of the old shrine.

Abbot Mote was led through the little door of the shrine into the vestry.

In the enclosure eastward to the lady chapel were three altars :

1. S. Amphibalus ; at the head of the shrine the door leading to it from the lady chapel is mentioned.

2. S. Edmund, king, on the north.

3. S. Peter, on the south, with his image and story painted.

The shrine of S. Alban was made by Abbot Geoffrey, 1119-45, with images and alto-relievos, cameos, and jewels. The golden plates were stripped off it by Abbot Ralph, 1146-51, who with the produce bought the town of Brantfield, to furnish funds for repairs of the church-roofs. Abbot Simon, 1166-83, made a feretrum of gold, silver, and gems over the high altar facing the celebrant, with the martyrdom of the saint carved on a line with his eyes. On the two sides his acts were pourtrayed in alto-relievo. On the upper part, towards the east, was a crucifix with Mary and John ; and on the top to the west was S. Mary and the Holy Child. Above it was a cresting, and at the angles were towers with crystal tops. Inside was the chest with the saint's relics.

A large beam with carvings of the acts of S. Alban was set above the altar by W. de Colchester, 1214-35 ; and six tapers burned upon it on great festivals. It is described as having on it the Patriarchs and Apostles, a Majesty, the Church and synagogue, and was afterwards set over the Mariola in the south wing of the transept.

The altars of S. John, S. Stephen, S. Peter, S. Amphibalus, S. Benedict, S. Michael, and S. Mary, had beautiful carved fronts or tables, coloured. S. Mary's had a retable, a superaltar of carved work, with a cross above and a painting below, 1195-1214. The table of the high altar was partly of metal and wood.

The Lady Chapel had been commenced for many years without further progress, when Hugh de Eversden, 1308-26, completed it, with a sumptuous altar erected by Reginald of S. Alban's. In its vestry, within the cemetery, Thomas Westwood, precentor, built a chapel of the Transfiguration, W. Roydon being the chief mason. Upon the chancel next the cemetery was once a wooden chapel with an altar, at which the mass for the dead had been sung ; but this service was removed to the chapel of S Mary of the Four Tapers, and the old chapel was destroyed.

Abbot's Lodge, 1151-68.—The chapel of S. Alexius, where the Mary mass was sung to note ; dedicated by Ralph, Bishop of Durham. It is said to have a door opening into the south aisle of the nave.

Abbot Thomas, 1349-96, built the Abbot's bakehouse, the watergate tower, the Abbot's kitchen, a wooden compartment for his chaplains within his chamber ; the wardrobe, the pentice and studies, the Abbot's chapel and study, or library. He also built the domus scriptoriæ.

At Abbot Thomas' burial, 1396, he was carried up the stairs of the chapel into the church.

Abbot Thomas, 1349-96, built the wall from the king's hall to the almonry ; also the new chamber joining the church wall, for guests.

The Abbot's lodgings, the Abbot's hall, the (xii., xiij., iiij.), the Abbot's kitchen, the spicery and surveying place between the kitchen (lxvjs. viijd.), and hall, are mentioned in the survey of Edward VI. The figures mark the valuation.

CONVENTUAL BUILDINGS.

The Abbot's lodge adjoined the nave, for the Camera Ecclesiæ contigua was built by Abbot Robert de Gorham and Ralph, 1146-51, built the chambers "joined to the church" and a gong covered with shingles.

1401-20.—Heywood built the inner chamber with its ceiling, chimney and windows.

1420-40.—His successor, Wheathampstead, built a chamber 95ft. long for the Abbot's lodging during the King's sojourn, at a cost of £300 ; and a library (mentioned with the new ordinance) adjoining it ; a chamber between the chapel and hall with a pentice leading to the same ; the study, clock chamber, garderobe, and lower study, besides shortening the King's Hall, and enlarging the Lower Court, at a cost of £41.

1464-74.—Abbot Albon added in the Abbot's palace, two stone buildings at the end of the King's Hall, one lodging for the cellarer, and one for the bursar.

Wheathampstead improved in the Abbot's lodge, the chamber between the chapel and hall, and rebuilt the gallery or pentice leading from that chamber to the hall ; enlarged the study ; altered the garderobe, supplying it with ewers, basons, pots, spoons, and salts, and enlarged the inner court, at a cost of £126.

A Quadrant (the base) court, one acre and a half in size. After the translation of S. Alban, 300 poor were yearly fed in this court.

On the North was the Great Gate House, with the King's Gaol, for the liberty of the town of St. Alban's, and the purveyor's lodging.

On the East side were lodgings.

On the South side were the King's Garners, adjoining the Old Hall, and lodgings, one having a garden ; and the square gatehouse called Hames Gate (destroyed in 1722).

On the West side were the King's stables ; and at the upper end the Almonry are mentioned in the survey of Edward VI., when the buildings were allotted among the King's riders, the master of the horse, and Sir A. Dudley, officers of the royal stables.

1235-60.—John II. built a noble house very long, of stone, and tiled, with three chimneys, opposite the Great Gate, to the adornment of the whole court ; it was of two stories, in the uppermost were the liberiores, Abbot's servants, and the lower formed the larder.

1151-68.—Gilbert, Bishop of Limerick, consecrated the Great Rood in the south part of the monastery.

Thomas de la Mare had license to crenellate the abbey with a wall of stone and chalk, from the King at Woodstock, 17 June, 31 Edward III.

1260-90.—Roger gave a bell called Amphibalus for Curfew. There was another called Alban.

CLOISTERS.

1214-35. — Abbot William built a cloister between the Chapter House and S. Cuthbert's Chapel (the latter has always hitherto been placed in the rood loft), and a three-sided cloister, in charge of the Kitchener. One side from the kitchen to the door of the Regular Cloister [qy. on the north] . . . . the other side from the door of the Monks' Regular Cloister to the door of the Guest House, [ulterius] formerly used by Benedictine guests, under the Hospitaller's charge [qy. on the east] . . . . The third side from this cloister door and the kitchen to the door, of the way to the Tailory, under the chamberlain's charge. [qy. on the west] . . . . The walls were latticed pariete contraticulato with a little plantation, in the custody of the hostillar.

1335-49.—In the time of Abbot Michael, the tresaunt of the cloister, called the Abbot's Ward

was erected to the height of the walls, and the great tresaunt raised.

The Tresaunce is an alley. It occurred at Ely. It was not the east alley. Probably there were the west and south alleys.

1396-1401.—John V. rebuilt two parts of the cloister with studies and libraries, and S. Nicolas Chapel, and over the vaulting of this cloister the library, and under the vaulting of S. Nicolas Chapel he intended to build aumbries for the conventual muniments.

1349-96.—Abbot Thomas glazed two parts of the cloister besides the ancient glass of the chapel "quondam pictoriæ," and made wooden benches.

Abbot Heywood vaulted completely the two parts of the cloister, adding buttresses which had been begun by Abbot John de la Mote, (1396-1401) and left by him half vaulted ; and he made the whole work correspond.

1151-66.—Abbot Robert built the Chapter House, regular parlour, S. Nicholas (probably the Guest) Chapel, all the cloister in front of the chapter house, the bath house, long horse stable (a lamp burning in it continually), granary, larder, and two solars.

Under S. Nicholas' altar Abbot Alfric concealed the relics of S. Alban.

John de la Moote, 1396-1401.—*The Prior's Lodge.*—In the Prior's Manse he built the chapel, the wine cellar, and the summer parlour (parlalorium cænaculum) under an old chamber, overlooking the garden. He built also other chambers at the end of this hall next the infirmary. He built the wall or de Ambulatory between this garden and the infirmary, to walk in during wet weather. The Prior's Chapel contained an altar of S. Symeon.

1396-1401.—John de la Mote, over the Dormitory Chapel built the Prior's chamber ; but its latrine was near the Guest Chapel, so it was said to be next the horn of the altar.

The Almonry.—The Chapel of S. Laurence, in the Almonry, was destroyed owing to the building of the great gate of the infirmary, which bore the name of S. German's Gate, where the dead brothers who died at Redburne were received and placed on the stone in the infirmary.

Sulnoth, the 8th abbot, placed semi-secular nuns in the almonry to administer the maunday or daily dole ; they attended the hours in the minster.

1195-1214. — *The Dormitory.*— John, the twenty-first abbot, rebuilt the dormitory and its adjunct the gong. The former is said to be a most noble building. The convent gave up their wine for fifteen years to find funds for the work. Abbot William, 1214-35, completed the dormitory and gong. The latter is called the Rere Dorter (as at Syon), with lodgings above and beneath in Edward the Sixth's survey.

1396-1401.—John de la Moote strengthened the dortor and its buttresses with new arches of Kentish stone, paved it, and made glazed the end window.

He built the cloister towards the kitchen and tailory, with its vaulting and chambers over it, and in the midst a cistern to catch the water for flushing the latrine ; and other cisterns near the refectory and wall of the Study House, and the Secret Rere or Private Dormitory (*i.e.* the Gong); at the end of this was a house to receive any guests of the Abbot, if there were an extraordinary number ; and in front of it two chambers for the chamberlain, and under the workshops of tailors and shoe makers. (III. 443.)

He rebuilt the Archdeacon's chamber (which had stood on the side of the private dormitory) in the great orchard. (III. 444.)

Domus Antiquariorum, the Scriptorium, is mentioned c. 1150.

1195-1214.— *The Refectory.* — John, the twenty-first abbot, rebuilt a most elegant refectory. Under the old refectory, that is in the cellarage, Abbot Ralph, 1145-51, prepared a chamber, which he occupied after his resignation. Abbot Thomas, 1349-96, gave £16 13s. 4d. to the building of the latter of the cloister, and pulled down the old wall of the refectory, next the cloister, rebuilt it. (III. 386.)

GUEST HOUSE.

1235-60.—John I. built in the hostry a noble Guest Hall, with several chambers adjacent ; one painted, with rooms, conclaves, chimney, atrium, court and under hall, worthy to be called, from its crypt and double stories, a King's Palace. At the entrance a noble atrium or entrance, called the Porch or Oriel, and other very beautiful chambers with conclaves and chimneys. This new hall and chapel and adjuncts was leaded. The old hall which stood in the same place was ruinous, the walls failing ; dark and unsightly. The roofs were of shingle and lateres (tile). The new hall and a side chamber and chapel were painted magnificently by Master Richard, monk.

1119-46.—AbbotGeoffrey de Mans built a large and noble hall with a double roof (probably, that is, in two aisles, it resembled the Infirmary Hall) for the Guest House, and near it a goodly chamber, called the Queen's Chamber, because used for her reception. No other woman was admitted within the precinct. Abbot John, 1235-60, bought a house for guests, probably poor folk, in Church-street. In the time of Garinus the Guest Parlour is noticed. John la Mote, 1396-1401, built the fair hall called the Conventual Oriel, under which are larders and fish-safes. The Kitchener's Lodging adjoined the Oriel, which entry is mentioned in the survey. John de la Mote, 1396-1401, built the kitchen, bakehouse, brewery, and chambers for stock, and [aisiamenta] offices of servants and officials. The bakehouse, brewhouse, boiling-house, and the laundry are mentioned in the survey.

1097-1119.— The first Chapel of S. Cuthbert was built by Abbot Richard.

1168-83.—Simon, the Bishop of Durham, dedicated S. Cuthbert's Chapel, which adjoins the cloister, in honour of S. Cuthbert and S. John Baptist, vi. Kal. Junii. The chapel, like that of S. Cuthbert at Durham, was in the cloistergarth facing the Slype or parlour. The roof became dangerous from age.

1214-35.—William built a new chapel of cut stone, with its glass windows and all other appurtenances ; and also an altar which Bishop John of Ardfert dedicated to S. Cuthbert, S. John Baptist and Agnes. Above its vault was a room with about twelve beds, with glass windows, and a leaded roof ; to supply the want of room in the dormitory. He built a cloister between it and the chapter-house to save passers by from rain droppings.

1214-35.—In the hostry of the convent was an altar to S. Cuthbert. S. John Baptist and Agnes, with their images in the glass ; built by Hugh, Bishop of Durham, in the time of William of Trumpington.

1151-68. *Infirmary.*—The Chapel of SS. Coomas and Damian consecrated by Gilbert, Bishop of Limerick. Abbot Geoffrey, 1119-46, built the infirmary, with its hall and chapel towards the east. In the aisle of the nave of the old infirmary, where the infirm used to lie, an altar in honour of the visitation of S. Elizabeth by S. Mary was erected by W. de Wintreshull, gistarius, and consecrated by William, Bishop of Chester, 1215-25.

The Hall was rebuilt in the 14th century.

A little cloister with certain chambers over, adjoined the *Rere Dorter*, abutting on one end on the oriel, and on the other part on the refectory.—(Survey 2, Edw. vi.)

1260-90.—Abbot Paul also built a cloister of four sides, by which the way lies to the infirmary, in the care of the infirmarer. They were both of oak, with rafters and ceilings, tiled with oaken shingles. As early as the time of Abbot Paul, "the door of the infirmary facing the cloister" is mentioned.

The infirmary is described as having been built by Roger de Norton, Abbot, 1260-91, he gave 100 marks to the works. In 1421, Dean Kentwode, of S. Paul's gave £8 to the work of the infirmary, and J. Beule, Warden of S. Andrew's Chapel to the hall of the new infirmary hall a great basin in 1428. J. Martyn at the same time contributed to the erection of the chancel. The Chapel of S. Laurence in the old almonry was destroyed when the great gate of the infirmary was built. Wheathampstead rebuilt the chambers of the infirmary, and repaired the chapel at a cost of £564. He also built that noble chamber extending there from the chapel of the infirmary up to that passage which leads from the conventual kitchen to the Prior's chamber, at a cost of £300.

The Cemetery was consecrated by Thomas, Bishop of Down, in it stood a cross.—1214-35.

Abbot John, 1235-60, repaired the garner, the water-mill near the brewhouse, and dug the fish-pool.

The great gate was built by Abbot Thomas, 1349-96.

Abbot Moote, 1396-1401, built the seneschal's chamber between the almonry and the stable-gate, and a hay-house with a wall to the great orchard gate.

There was a large house between the infirmary and great orchard, called Pictoria from its paintings, used by the abbot, to escape noise and interruption.

There was a wall at the lower side from the west door of the church to Halliwell gate by the bridge ; houses were built along it, and their occupants broke through its windows, and so entered the Saciest's Garden.

The survey of Edward VI. gives us the first hint of destruction, in the valuation of the buildings, the quadrant cloister lvi*l.*, the chapter-house vj*l.* xiij*s.* iv*d.*, the lavatories with the lead x*l.*, the old hall xx*s.*, the Prior's lodging xxvj*l.* vj*s.* viij*d.*, the bursar's and cellarer's lodgings ix*l.* vi*s.* viij*d.*, the little cloister xii*l.* xvj*s.* viij*d.*, the well-house (the conduit in the cloister) xlvj*s.* viij*d.*, the oriel lxxxvi*s.* viij*d.*, the new ordinance (the office of the Master of the Works') and library xii*l.* vi*s.* viij*d.*, the infirmary and chapel xx*l.*, the barn and brewhouse adjoined the laundry garden, between the barn reserved for the king's stables and the river. The whole valuation was £205 7s. 4d. The base court was reserved for the king's stables. The reign of this king shows in indisputable records a continued destruction of all that was beautiful in art, and venerable—nay priceless, in architecture.

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NOTES ON SOME OF THE TIMBER BUILDINGS IN ENGLAND DURING THE MIDDLE AGES.*

BY CHARLES BAILY.

GREAT TANGLEY, near Guildford (illustrated on page 95, ante), is a house which, from the external appearance of its timber-framed front, we should expect must have been built near to the end of the sixteenth century ; indeed, the date, 1582, more than once appears on the trusses under the sill of the window of the room over the porch, and again on the gable to the left of the same. With the exception of the arched opening of the porch, and that of the entrance to the house beneath it, the whole of the front is certainly of this date, and the design, with its long ranges of narrow lights of square-headed windows, extending quite across the two gables from side to side, is quite in accordance with other works of the same time.

It will be observed that the windows, one above the porch and one in the gable end, project from the framed front, those to the upper story being supported on brackets carved with foliage. A space now plastered over on each side of the projecting window, which lights the upper floor in the left gable, will also be noticed, beneath this plastering ; window lights also exist, but of a shorter proportion, the sills being on a level with the transomes of the centre window ; this is a feature often seen in the houses of the time of Queen Elizabeth.

The barge-boards of this time, as seen in this example, are not cut with tracery, but are moulded, and sometimes carved with foliage and ornaments derived from Italian forms. But the careful observer, when examining the interior of Great Tangley, will soon discover the skeleton of a much earlier building within the Elizabethan enclosure, and which perhaps may have been a work finished a century before the date upon the outside.

When the latter front was erected, an addition of about 4ft. 6in. appears to have been made to the house, filling up the recess in the front, and the hall of the older house was divided in its height into two stories, by the introduction of a floor. This older hall on the ground level extended in length from the screen at the side of the *entrye*, quite to the end of the present structure. In the ground-floor rooms, most of the finishings belong to the later house ; the large room, being the lower part of the hall, has its sides lined with wainscoting, framed in small-sized panels, and the division between this room and the *entrye* appears to be the remains of the screen, but which is of a very plain character. It consists of seven round posts or columns, framed into a sill at the bottom, and into a head at top. Of the two doors, one is now stopped up. The two doorways leading from the *entrye* to the parlour and to the offices are square-headed openings, and the mouldings of these, as well as of the screen and of the wainscoting, are the

* Read before the Architectural Association, Jan. 14, 1870.—(Continued from page 132.)

quarter-rounds and ogees, so often met with in the works of the time of Queen Elizabeth and King James I.

An older doorway, with a flat four-centred arch, exactly corresponding with the work of the porch, and evidently belonging to the original house, is still left in a closet at the back of the *entrye*, and in a line with the two other doors.

The parlour on the opposite side of the *entrye* to the hall, with the exception of the fireplace, retains its sixteenth century character. It is wainscoted throughout; and the internal effect of the square bay window, with its small glazing, is highly picturesque.

But it is in the uppermost rooms that we find the fullest evidence of the older house remaining. We have seen the roof of the old hall in a nearly perfect state. It is in four bays, of unequal widths, formed by three framed principals, with very massive tie-beams supported on the upright story-posts of the old outside framed back and front walls, with curved braces underneath, and supporting short king-pieces, with arched strutts to collar and leon beams.

The large scantlings of the timbers we may here notice. The tie-beams in the centre measure 1ft. 8in. deep, by 10in. thick; these are cambered to a great extent, the natural bend of the tree being taken advantage of for this purpose. The braces beneath the ties are 4in. thick. The king-posts are 9in. square, and the arched strutts measure 3in. in thickness. The story-posts, which carry the ends of the tie-beams, measure 10in. wide, by 9in. thick, and are hollowed on the internal angles.

The upper part of the original hall extended over the *entrye*, where was the music-gallery, making the length in this part 29ft., the width between the story-posts being 20ft. That the original house extended in the length of the front beyond the upper end of the hall there is positive proof; for the older timber-plate, with the circular bracket beneath it, which carried the jetty or overhanging floor of the upper story of the gable end of the older house, is left, as also the carved bracket, and the window-jamb adjoining to it, belonging to the front, erected A.D. 1582.

We have still remaining in the county of Surrey two important examples of domestic chapels: the earlier is at Lambeth, and is the work of the first half of the thirteenth century. The windows, which consist of triplets of lancets, and the entrance, which has a semi-circular arch over a double doorway, are interesting in their way.

The later example is attached to the Archiepiscopal Palace at Croydon. Externally it is a plain building, principally of red brickwork: the badge of the cross keys and some figures of crosses are worked in black-headed bricks on the western gable. This room, which is raised on a basement, has for very many years been used as a school-room, and the interior is still kept in a very perfect state. It is divided by an open screen into two parts—the ante-chapel, with its gallery, and the chancel or choir, with the original desks and seats. This chapel, which is five bays in length, has a panelled ceiling in wood, slightly raised in the centre; beneath the tie-beams are arched timber braces, the mouldings of which are continued down the side walls, between the windows to the floor. The mouldings of the ceiling and screen are bold in the sections, and the whole is a valuable example of the time of its erection, which was probably about the middle of the sixteenth century. There can be little doubt that the room in a manor-house which was fitted up for a chapel was also very frequently used for domestic purposes.

It is hardly necessary to state that manor-houses, as well as other establishments of importance, were nearly always surrounded with moats; not exactly as a fortification against military attacks, but more as a defence against ordinary vagrants and thieves. At Great Tangley, as well as at Crowhurst Place, the moat remains in a very perfect condition. At the latter house, the side of the building which contains the kitchen and offices rises directly out of the water. A great number of moats are to be seen round the old farm-houses in the counties of Surrey, Kent, and Sussex. At Hever Castle there were two moats, one outside the other; and situated between these is a very curious building of timber, of two stories, which appears to have been erected for a barracks, with a range of rooms above, over the stables below. The details show it to be a work of the first half of the sixteenth century, and it is not unlikely to have been erected for the accommodation of the attendants of King Henry VIII., when upon his visits to Lady Anne Boleyn.

Towards the end of the reign of King Henry VIII., many timber-built houses were finished externally with a coat of stucco, either between the timbers in panels or entirely covering over the whole of the surface, and ornamented with bas-reliefs of foliage and other figured work. Examples of this kind of work, called pargetting, appear to have been more common in towns than in the country. Numerous specimens are to be seen at Maidstone, Ashford, Ipswich, S. Alban's, Saffron Walden, and Waltham Abbey, and at many other places; and throughout the county of Essex it was the practice even as late as the middle of the eighteenth century to cover the fronts of the wooden houses with a rough cast, and to score the surface with scrolls or wavy lines, with smooth borders or styles round the outsides of the panels.

We find at Crowhurst a long settee fixed to the upper end of the hall. This seat is quite as old as any part of the house; the details of the mouldings agree exactly with those of the original doors, both of the external and of the internal entrances; and this is without doubt the seat belonging to the dais, the floor of which at Crowhurst appears not to have been raised above that of the other part of the hall, as was usually the case in the halls of most ancient houses. This seat is 1ft. 10in. high from the floor of the hall, which is level with that of the *entrye*; and it is not likely that the floors of the *entrye* and of the lower part of the hall have been raised; and the short length of this apartment appears to be a good reason for keeping the whole floor on one level. The hall measures from the screen to the upper end 23ft. 5in., and from front to back 25ft. 8in. in the clear.

In the feudal times, before the wealth of commerce had asserted its pretensions against the claim of our old nobility and gentry to exclusive homage, every advantage was taken of the opportunity afforded by the glazing of the windows to display in stained and painted glass the heraldic insignia of the family of the founder, and of his connections. Shakespeare makes Bolingbroke reproach King Richard's minions:—

———"You have fed upon my signories,
Dispark'd my parks, and fell'd my forest woods;
From my own windows torn my household coat,
Raz'd out my impress, leaving me no sign,—
Save men's opinions, and my living blood—
To show the world I am a gentleman."—
King Richard II., Act iii., scene 1.

The windows of the old hall of Ockwells manor-house were, to within a few years of the present time, glazed with many coats of arms, coeval with the original building, the colours of the glass being distinct and vivid. Among which were the arms of King Henry VI., with the antelopes, his supporters, and the motto *Dieu et mon droit;* of his queen, Margaret of Anjou, with her supporters, the antelope and the eagle, and motto *Humble et loyall;* of Norreys, with beavers for supporters, and motto *Ffeythfully serve;* of the Abbey of Westminster; of Beaufort, Duke of Somerset; of Edmund, Earl of March; of Henry, Duke of Warwick; of De la Pole, Duke of Suffolk; of Sir William Beauchamp; of Lord St. Amand; of Sir William Lacon, of Bray, Chief Justice of the King's Bench; of the Lord Wenlock; of Sir Richard Nanfan, captain of Calais; of Sir John Pury Kent, of Chamberhouse Castle, in the parish of Thatcham, Berks; and of Bulstrode, quartering Shobingdon. The last was probably intended for Richard Bulstrode, Esq., one of the builder's executors. The royal arms were surmounted by highly bowed crowns, the others by crests and lamberquins. The mottoes were several times repeated in old text character, in diagonal lines across the window-lights, the quarries of the back-ground being powdered with yellow flowers. This interesting glass was removed a few years ago to another house.

Much painted glass—consisting of coats of arms, badges, and other figures—is still preserved in many of the windows at Sutton Place, near Guildford. Amongst which is the curious rebus of the Weston family. It appears also on many parts of the exterior executed in terra cotta. It is a vine-leaf with a bunch of grapes, in conjunction with a barrel or tun. We must read it in Norman French. The grapes as UVES; the UV in which is equal to double V, or W. UVES thus becomes WES, and the tonne or tun completes the name Weston.

A ridiculous story is told respecting these figures. The people in the neighbourhood of Sutton Place say that Sir Richard Weston was brewer to King Henry VIII., and that the grapes, which they call a bunch of hops, and the tun are allusive to the fact: but the truth is that Sir Richard Weston held a higher position: he was Lord Chamberlain to the king.

(To be concluded in our next.)

THEORY, FUNCTIONS, AND INCIDENTAL USES OF CHIMNEYS. *

ANCIENT civilisation, to which architecture is so much indebted in other respects, prospered in the warm climates of Egypt, Greece and Italy, where fires in the apartments were seldom necessary. It has therefore thrown but little light on this branch of science.

The ancients had no chimneys in their dwellings. The "Kapnodoche" of the Grecian dwelling was most likely nothing but a hole in the ceiling through which the heated products of respiration of man and of combustion of charcoal in the braziers then in vogue, passed off, after having mingled with the air, according to the law of diffusion of gases.

It has been said that history has failed to record the inventor or to define the place where the chimney was first used, but as with other acquisitions of modern civilisation, it must be acknowledged that this progress of personal and fireside comfort is rather the result of the combined efforts of generations than of individual men. The apparatus used by the old Romans, in connection with their warm baths, having been lost to the masters of the middle ages, we find the primitive elements of the modern chimney in conical smoke tunnels ascending through the thick walls of castles of the Anglo-Saxon period in England when certain necessities stimulated invention; and it is not difficult to trace the transition from these contrivances to the common chimney, of which we find the first authentic record in the 12th century in France, in the 14th century in Italy, and in the reign of Queen Elizabeth in England, when lady visitors in lordly mansions were frequently sent out to other houses, where they could have the enjoyment of a fire-place, that modern luxury, which is now considered as one of the working-man's wants.

The chimneys, in the first instance, serve the purpose of effecting a regular and quick access of air to the grate as required for the chemical decomposition of bodies containing a large percentage of carbon and hydrogen, which are called fuel. This decomposition gives birth to new combinations, accompanied by development of light and heat, and it is called combustion. The quantity of air which flows through the grates depends mainly upon the proportions of the chimneys. A second, and no less important function of theirs, especially in our large cities, is to discharge the products of the combustion into the air instead of allowing them to spread over the room. If these gases are visible, as smoke, the presence of pure carbon or carbonic oxide, both combustibles and results of an incomplete combustion, is indicated—the first being a pure waste, and the second in part so, constituting a lower degree of oxidation than the incombustible carbonic acid, the formation of which shows an exhaustion of the heating powers of the fuel. The gases are impregnated with carbonic acid, steam, combustible vapours and nitrogen, as the incombustible part of the feeding air, and would be injurious to health if diffused immediately in too limited a height; therefore they must be carried beyond the reach of human abodes, to be caught and diffused by the currents of the atmosphere, without doing any harm. To serve the latter purpose the chimneys are frequently built higher than would be requisite for effecting the necessary draft.

Without entering minutely into the computation of the sizes of chimneys for open fires or for stoves, it is proposed in the sequel to give some rules mainly agreed upon by the theorists in order to serve as a guide for practical life. These rules must be applied judiciously, since the nature of the fuel and local circumstances affect them.

Nevertheless, they are apt to give the limits within which to move, in order not to commit any gross errors against physical laws, or to cause

* Read by Mr. ADOLPH CLUSS, of Washington, before the American Institute of Architects.

an unwarranted waste of fuel in a century which may justly be proud of its progress in the science of the laws of nature. The draught of a chimney, namely, the velocity or ascensional force of the currents within it, is determined by the rules of hydraulics, since, on account of the small difference between the pressure of the air within and outside, the rules for efflux of water may be safely applied. It depends primarily upon the height of the chimney. Heated air, rising in a vertical pipe, open at both ends, represents a column of air equal in height to the height of the pipe diluted in proportion to the intensity of its heat, and which is lifted by an equally high column of exterior, colder, therefore heavier, air, in the manner in which, with communicating pipes of equal height, a fluid of less density in one pipe is raised by the denser fluid in the other pipe. Within certain limits the taller the chimney or the hotter the gases, the more rapid will be the draught.

Suppose the air in a smoke-stack of forty feet height being heated to 212°F. above the exterior air. Its density and weight will then be about three-quarters of those of the surrounding atmosphere. The consequence is that the exterior air will enter the lower end of the chimney with a power equal to the weight of an equal sized column eleven feet in height, since twenty-nine lineal feet of the exterior column weigh as much as forty lineal feet of the heated column. The velocities of the current in chimneys of equal height and with equal differences of temperature, increase with the square-roots of their diameters, provided that the section of the flue from which the warm air enters is at least equal to that of the chimney. Moderately wide chimneys offer, besides, the advantage of cooling off the ascending air less, because the surfaces of contact, as elements of the retarding element of friction, are proportioned to the diameters, whilst the volumes of moving air are as the squares of the diameters. Chimneys should, therefore, have a moderately wide shaft, but the upper orifice of their tops, regulating the efflux of the gases, should not be larger than is requisite for a discharge with proper velocity, say ten feet per second, because otherwise cold air would enter, force a downward current by the side of the ascending column, and, besides causing a disadvantageous cooling off, would interfere directly with the draft.

A proportionably wide chimney, having low velocity coupled with a smaller upper orifice, will therefore bring the actual velocity of discharge near to the theoretical velocity. It may reach as much as eight-tenths of the latter, after deduction has been made for friction at the rims and against the side walls of the opening.

Another agent, besides the heat of the interior column, is the velocity, which increases with the higher layers of the atmosphere and their more or less horizontal direction, tending to carry off the discharging gases.

The breezes in the higher regions are more regular and stronger than near to the ground, where their movement is weakened and interfered with by friction and many other obstacles.

But still more important under this head is the effect of an absolute dilution of the air in the smoke-stack under certain circumstances.

If the temperature of the air in a smoke-stack is equal to the temperature of the exterior air, and there is no cause for a change of the specific gravity and the pressure of the air on one of both sides, then the column of air within the stack will be at rest.

But if an atmospheric current, a wind, moves in a horizontal or ascending direction immediately above the mouth of the smoke-stack, then the quiet column of air within presses, with an elasticity dependent upon its atmospheric pressure, against the moving exterior layer of air, which consequently sweeps along the particles of air at the orifice by air friction. This causes an absolute dilution of air in the stack, therefore a rapid flow of air from the fireplace to the stack, and causes frequently during heavy gales an unusually strong draft in the smoke stack, even at times when there is no fire and the thermometer shows the air to be colder in the chimney than in the open air; which case is mostly observed in the spring.

The useful height of a smoke stack has, however, also a limit, to exceed which will diminish the draught, and which, therefore, must be considered as the maximum height of the stack. The warm air which enters the smoke stack from the fireplace or furnace cools off whilst rising, thus becoming denser and heavier; for a corresponding height of the stack it would finally reach the temperature or the density and weight of the exterior air. So far the height of the stack helps the draught; with a greater height, however, a column of air would exist within the stack which does not differ in weight from the corresponding exterior column, and consequently does not increase the draft. On the other hand, this is objectionable, since whilst lifting this dead column of air, its friction against the walls of the stack must be overcome, and the power required will therefore be lost for the effect of the stack. The height of chimneys in dwellings is determined in most cases by the height of the dwellings themselves, since, generally, they must be exceeded a few feet. Their size is fixed mostly by municipal regulations, which cannot well be altogether disregarded, though they still partake frequently of the character of a law in the reign of the First Edward, when a man was tried, convicted, and executed for burning sea coal in London!

An efficient combustion requires, aside from the quantity, also a certain velocity of the feeding air. If this is too small, the exterior air will not be mingled properly with the combustible gases in the fireplace, and the latter escape in part, from the process of combustion forming a settlement of vegetable acid, tar and soot in the flue. This slow and incomplete combustion will not reach the high temperature which is to be aimed at. If the velocity of the air is too great, the combustion will take place completely close down by the grate, the flame will be short, the circulation of the hot gases will be very small, they will be hurried along in the chimney, and the costly fuel will not be consumed to any advantage. If the gases are not left time to part with their heat, we poor freezing mortals are condemned to buy dear fuel—in order to produce carbonic acid! The most proper velocity within the chimney depends upon the kind of fuel and apparatus. Seven feet per second will be a good average in dwellings, in order to make the combustion as complete as possible. Suppose this velocity to be doubled, then twice as many adhering particles of air will not only have to be torn away from the walls, but will also have to be pushed forward with a doubled velocity, and this requires a power increasing in the square. The resistance of friction is, therefore, proportioned to the square of the velocity. Chimneys for open fireplaces, besides being conductors of smoke, serve also the purpose of renewing the air, or ventilating the rooms. If their size is proportioned to one square foot in stem, and contracted to one-half of a square foot in chimney top, for every 3500 cubic feet of the space to be heated, they answer, with the average height of our city dwellings, the stated conditions, and change the entire volume of the air in the room five times per hour. The most useful sizes of chimneys required for good-sized parlours are rather large. It is advisable in such cases to have two fires, since otherwise it will be difficult to avoid the backing of the smoke while building the fire. On the other hand, however, no such chimney of any room should have less area than one-half of a square foot. In Russia and Germany, where stoves predominate, flues of no more than 6in. in diameter have lately become very popular, without much previous reflection, facilitating, as they do, the task of the designing architect, since with moulded bricks they need not form any projection, even in a nine-inch wall when it is stripped inside. But it is now admitted that, in consequence, the coal dealers flourish, whilst the housewives complain. No flue of any kind should have less than 60 square inches sectional area, otherwise the fuel will be wasted.

(To be continued.)

NOTICES OF PUBLICATIONS.

Memorials of Temple Bar; with Some Account of Fleet Street and the Parishes of S. Dunstan and S. Bride, London. By T. C. NOBLE. London: Published by Diprose and Bateman, 13, Portugal-street, Lincoln's-Inn-fields.

TEMPLE BAR seems by common consent to have hitherto escaped the notice of antiquarians. Its approaching demolition has inspired the author, himself a native of Fleet-street, with the idea of recording its history. The book naturally deals principally with the associations connected with the old City Gate, and appears by the preface to be a preparation for a larger work.

The Ironmongers' Almanac and Text Book. London: 44A, Cannon-street, E.C.

POSSIBLY we have been favoured with one of the surplus copies; if not, the middle of February seems rather late for the appearance of an almanac. This, however, is all that can be said against it. It is well got up, and full of good information.

Marvels of Architecture. Translated from the French of M. Lefevre; with a chapter on English Architecture. By R. DONALD. London: Cassell, Petter, and Galpin.

THIS book has no claim on professional readers farther than in respect of the subject of which it treats. To the general reader it will, doubtless, be of interest, got up as it is with a wealth of illustration and ornament. We did, however, expect a little more in the concluding chapter, which, as it at present stands, is truly described as "short and sketchy." The book has, indeed, every appearance of having been written to fit the illustrations; it is, however, as a whole, well worth a place in every boy's library, whether as a prize book, or otherwise.

The Year Book of Facts. 1870. By JOHN TIMBS. London: Lockwood and Co., Stationers' Hall-court.

THE indefatigable scissors of Mr. Timbs are perhaps more busily employed throughout the year in the preparation of this work than on any other of his numerous compilations. The title is hardly borne out by the contents, many of the discoveries, &c., recorded being as yet anything but facts. A good portrait of Mr. E. J. Reed, the Chief Constructor of the Navy, is given, and a small illustration of the Holborn Viaduct.

Report on the Projects of the Railway, Tramway Companies, and other bodies applying to Parliament during the Session 1869-70, *for powers in respect of various matters affecting the City of London.* By WILLIAM HAYWOOD. London: M. Lowndes, Fenchurch-street, E.C.

FIVE railway schemes, more or less affecting the area under the jurisdiction of the City of London Commissioners of Sewers, are described in the report, to none of which we imagine any serious opposition will be offered by the Corporation. The Southwark and City Subway, and the Charterhouse Market (at present abandoned) are also alluded to. The principal and most interesting part of the publication is, however, that which relates to the London street tramways. The questions affecting them seem very fairly considered by Mr. Haywood. He points out the difficulties connected with their adoption, but, on the other hand, truly observes that "great difficulties have, however, been overcome in the construction of railways and other engineering works; and we should not have had the benefit arising from them had every obstacle in their way, or had every objection which could be raised against them, been sufficient to prevent their construction."

ON VARNISHES.

As a rule, all varnishes should be kept in a dry place. It should also be observed that they should be applied in a dry place. Much, indeed, depends upon the state of the weather when they are employed—more than is easily credited—and the work should be kept in a warm place until thoroughly dry.

All varnishes in which spirits of wine is the menstrum should be used in a warm place.

Foremost among varnishes is the real original.

French Polish. — Gum sandarac, fourteen ounces and two drachms; gum mastic, in drops, seven ounces and one drachm; shellac (the yellower the better) fourteen ounces and two drachms; alcohol, of 0·8295 sp. gr., three quarts and one pint.

Pound the resinous gums, and effect their solution by continued agitation, without the aid of heat.

If the woods are porous, seven ounces and one drachm of Venice turpentine.

If also an equal weight of ground glass with the gums be added, the solution will be more quickly made, and otherwise benefited by it. Before using, the wood should be made to imbibe a little linseed oil, the excess of which should be removed by an old flannel.

The varnish should be applied by saturating a piece of old soft coarse linen cloth, folded into a sort of cushion, rubbing the wood softly at first, turning the linen from time to time until nearly dry. The linen should be saturated afresh, and the rubbing continued until the pores of the wood are completely filled.

Two or three coats are generally sufficient. Do not rub hard. If the varnish becomes tacky, apply a very little drop of olive oil uniformly over the surface of the cushion.

The finishing process consists in pouring a little pure alcohol upon a piece of clean linen, which is lightly rubbed over the varnished wood, and as the

linen and varnish dry, the wood is rubbed more briskly, until it takes a beautiful polish like a looking-glass.

The above may be relied upon as the original and genuine French polish, it being in the "Dictionnaire Technolgique," an accurate French work.

Seedlac Varnish.—Wash 3oz. of seedlac in several waters, dry it, and powder it coarsely. Dissolve it in one pint of rectified spirits of wine, put in a gentle heat, shaking as often as convenient, until it appears dissolved, pour off the clear, and strain the remainder.

Shellac Varnish.—Take 2½oz. of shellac, break it into a coarse powder, put it into 1 pint of spirits of wine, keep it in a warm place a few days, shaking frequently until dissolved; strain.

Copal Varnish.—Dissolve the copal, broken in pieces, in linseed oil, by digestion, the heat being almost sufficient to boil the oil. The oil should be made drying by the addition of quicklime. This makes a beautiful transparent varnish. It should be diluted with oil of turpentine; a very small quantity of copal, in proportion to the oil, will be found sufficient.

Gum Sandarac Varnish.—A colourless varnish may be obtained by dissolving 4oz. of gum sandarac and 1oz of Venice turpentine in 16oz. of alcohol by a gentle heat; it is not very hard, however.

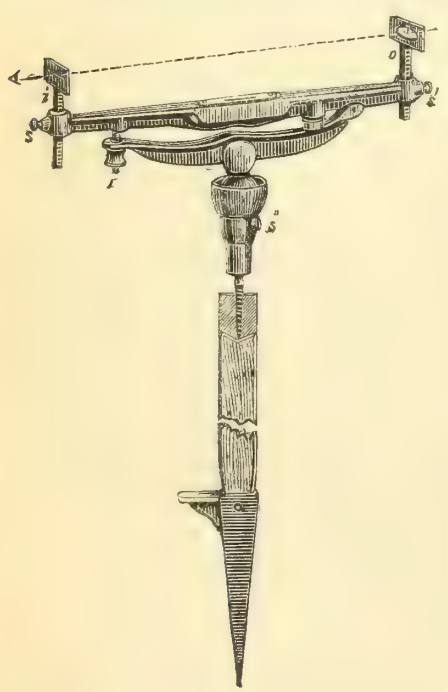
Mastic Varnish.—Mastic should be dissolved in oil of turpentine, in close glass vessels, by means of a gentle heat. This varnish is extensively used in transparencies, &c.

Bookbinders' Varnish.—5oz. of shellac are to be dissolved in 1 quart of rectified spirits of wine; add 10oz. of burnt and recently heated animal charcoal, boil a few minutes, subtract a little of the liquid, and see if it is colourless; if not, add a little more charcoal. When colourless, strain through silk, and afterwards filter through blotting-paper; if wanted perfectly pure, strain when cold.

Caoutchouc Varnish.—Digest 2 parts of caoutchouc, cut in shreds or small pieces, in 64 parts of rectified oil of turpentine; strain through linen cloth.—*English Mechanic.*

TOWLE'S GRADE AND DRAINAGE LEVEL.

THIS, according to the *American Journal of Gas Lighting*, is a neat, durable, and simple instrument, which is intended to meet the wants of the student and the practical surveyor as well. The illustration herewith gives a clear idea of its construction. To make its operations perfectly plain, the following example is given:—Problem.—To set a number of stakes or pegs in the ground, to define the surface of a proposed concrete floor for instance, so that their top ends shall be in the same horizontal plane—and at the same time so that all the pegs shall be of the same level as some other peg, marked A:—



1st. Erect the instrument and level it nearly over peg A; measure with a rod (a pine stick 1in. square and about 8ft. long will do very well) from the peg A, up to the line of sight, and put a small nail or pin at that height, into a rod for a mark to sight at.

2nd. Now proceed to drive another stake, B, wherever desired, and turn the instrument on its ball and socket joint, to bring the line of sight to bear upon the rod, when placed and held by an assistant, upon this stake. The bubble, after being brought to the centre again, will readily indicate whether the line of sight, which will then be horizontal, strikes above the mark or nail on the rod, or not; if it strikes above the mark on the rod, the assistant must drive the stake gradually, till the mark exactly corresponds with the line of sight—when it will be in the plane of the level—and then, inasmuch as the top of both stakes (A and B) are the same distance below the plane of the level, they are themselves in the same horizontal plane. In a similar manner proceed to place as many other stakes as may be required.

With this instrument can be laid out the proper grades for drains, ditches, roadways, &c., and the proper levels for foundations of houses, bridges, concrete floors, artificial ponds, &c., by anyone who understands the principles of a common carpenter's or mason's level.

Hamilton E. Towle, Civil Engineer, Broadway Rooms, New York, is the patentee.

Building Intelligence.

CHURCHES AND CHAPELS.

EGREMONT.—A new Baptist chapel has been opened at Egremont, Liverpool. It is an oblong building under a single span roof, gabled at either end. The chapel is built of stock bricks with Stourton stone dressings, and is in the Early English style of Gothic architecture. Accommodation is provided for about 300 persons, and the cost is slightly under £1000, exclusive of the land. The work has been carried out by Messrs. J. and T. Mason, builders, Egremont, from the designs and under the superintendence of Messrs. Danson and Davies, architects, Grecian Chambers, Dale-street, Liverpool.

TOTNES, DEVON.—The first section of the fine old parish church of S. Mary, which has been for the last eighteen months undergoing restoration, was opened on the 13th inst. The organ, which has been taken down from the gallery, where it formerly stood, and re-erected on a platform in the new part of the church—the north-east—after having several new pipes and stops added by Mr. Hamlyn, of London and Newton Abbot, was re-opened at the same time. The restoration of such a large building of course necessitated the outlay of a great amount of money, and it was not until a considerable sum was promised that the vicar commenced his task. The services of Mr. George Gilbert Scott were engaged, and at his recommendation the northern aisle has been extended, thus greatly increasing the sitting accommodation, and allowing for the removal of the western gallery, and also the abortive galleries over the beautiful rood-screen. The whole of the architectural beauty of the edifice is thus thrown open. At the west end there is a fine arch, which before was entirely lost to view. In this there will be placed a handsome window, which will afford air and light to a portion of the church, hitherto badly ventilated and quite dark. In order to do this, however, the belfry will have to be raised a story higher. At the commencement of the restoration it was decided, in order that Divine service might be continued on Sundays, that the work should be divided into sections. The first section, as already stated, was commenced eighteen months ago by Mr. Reeve, of Totnes, who agreed to execute the same for £1100; the cost of the second section, estimated at £800, will include the reseating and renewing of the whole of the part from the screen to the nave. This is now in hand, and considerable progress made in the work. The pulpit, of finely-carved stone, is also undergoing renovation, and a temporary one has been substituted. A prayer desk, of polished oak, costing £37, is now in course of preparation; it is the gift of the vicar. The restoration of the stone and wood carving was entrusted to Mr. Harry Hems, of Exeter.

HEADINGLEY CHURCH.—This church, which has been closed since August last, was re-opened on Sexagesima Sunday. The alterations consist of the building of an organ chapel and vestry, and of the re-arrangement of the whole interior of the church. A handsome carved reredos in the form of an arcade, with cornice and cresting, has been erected across the entire east end of the church; and a portion of the chancel has been covered with fancy tiles. The font has been removed below the tower, and a proper baptistry constructed. The outlay has been about £1050. The works have been carried out under the superintendence of Mr. Charles Fowler, architect.

BUILDING.

SUNDERLAND.—A new bank has just been completed at Sunderland for Messrs Backhouse and Co. The style is French Gothic, the main front of the building being ornamented with polished granite shafts, with carved stone caps and finely chiselled corbels. Mr. G. G. Hoskins, of Darlington, was the architect, and Mr. Gradon, of Durham, the contractor. The carving was executed by Messrs. Farmer and Brindley.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

P. O. O's. to be made payable to J. Passmore Edwards, at the Strand Office. All cheques to be crossed on the Union Bank.

RECEIVED.—Fuller and Laver—G. R. R.—Editor *Northampton Mercury*—G. B.—F. C.—J. W. Jun.—C. G.—W. J. C.—C. F. H.—J. V.—J. P. S.—J. C.—J. P. and Co.—C. P. and Co.—R. S. and Co.—W. S. T.—J. H.—D. J. W.—C. H.—W. O. C.—R. D. and Co.—J. P. S.—C. B. A.—J. H.—S. W. and Co.—W. B. and Son—W. L. W.—W. Sutherland—C. S.—W. H. L.—M. E. G. W.

Correspondence.

PLYMOUTH GUILDHALL COMPETITION.

(To the Editor of THE BUILDING NEWS.)

SIR,—I intended to have continued my crude remarks upon the appointment and duties of a referee, but the letter which appears in your impression of this week leads me back unwillingly to the Plymouth competition.

It must be very unedifying, and I hope as distasteful to your readers as it is to me, to see personalities creeping into discussions on professional matters. I cannot see why we should not give each other credit for *bona fides* when in competition with each other, and be able, with free but friendly criticism, to discuss matters of professional interest without imputations of unfair conduct. But Mr. Reid has flung abroad such open charges as well as frivolous insinuations in his letter to you, that they must be met out of consideration for third parties, if not out of mere self-respect. When Mr. Reid states he has not seen any printed statements, &c., he must forget that he has seen a copy of my remarks, &c., which I sent to him at his personal request, for to this very printed statement he refers further on. Then he states what is totally incorrect (but which would be no matter for regret were it otherwise), viz., that I am indebted to my acquaintance with the Town Clerk for the appointment of architect to a certain building at Plymouth. Mr. Reid should be more sure of his facts before he undertakes to instruct people in them. The one modicum of truth is that I know and sincerely respect the Town Clerk of Plymouth—too well indeed, to allow that that gentleman would be a moment swayed in my favour in discharging a public duty. Besides, what is the favour after all—mentioning the fact that I had provided extra accommodation and sent estimates with and without such extra work? Now I say that to suppress this fact would have been unfair in any one; but what shall be said of those who in council, totally unknown to me, actually stated my design was "good?" They must have been of course grossly unfair, and in some secret way ruled by, though not known to me. Yet I have said I believe I do not know one member of council even by sight, while Mr. Reid and those who have gained the competition probably know every one, and have frequent personal communication with them. But away with all talk of being biassed by unfair personal prejudices. I believe now that my design was the most suitable, according to the instructions and the block plans given to competitors, but the council do not seem to wish that plan, and are now going to adopt a "one block" system. This may involve injustice to all of us, but not necessarily any unfair bias for or against individuals. And here is the rub in competitions—an injustice to some one or to our mistress Architecture herself is hardly possible to be avoided. Either some technical difficulty starts up, and justice between man and man must be done, to the detriment of architecture, and so the best art is not chosen, or in some way the best design involves the transgression of some of the instructions, and if chosen for execution injustice is done to individual competitors. It is our duty, though a very severe one, to prefer injustice to ourselves rather than to our art, and so all men in the end will rule it, if a nobler building is got by this means. The very fetters of instructions, especially if drawn up by unpractised hands, prevent a free flow of architectural idea, while it seems perfectly unjust to choose any but the designs which are within the very limits which so fetter the artist. This seems to be the reason of a frequent choice of a design which has not calculated the cost or cared for the instructions in preference to those which most clearly have attended to them, and have calculated the cost exactly. And this leads me to the "mistake" which it is said the council had made, inasmuch as they now find (it is said) that "Nina's" design is but a few hundreds in cost above that of "Ich Dien." Now "Ich

Dien" was estimated at £39,770—with all the extra accommodation, and £30,000 without it; and these estimates were pronounced by Mr. Waterhouse as "very reliable." "Nina's" estimate is said to be £40,000, and Mr. Waterhouse states "the cost would far exceed the sum suggested; indeed, the author himself to a certain extent admits it."

Now is it a mistake to say that "Ich Dien" is the cheapest only by a few hundreds? Mr. Waterhouse, moreover, in his letter to THE BUILDING NEWS quoted before, places "Ich Dien," with "Fiat Justitia," as among the cheapest designs exhibited. It is evident from this, and not from what I say, that a "mistake" is committed in stating the cost of "Nina's" design to be so near that of "Ich Dien." Again, Mr. Reid says he differs from me in my "opinion" that I pick no holes in other designs. Now it is not an *opinion*, but a *fact*, that I do *not* pick holes in other designs, though Mr. Reid does in all very freely. I quote Mr. Waterhouse's report, and state I have not seen the designs, except to glance at one or two drawings of each as hung up at Plymouth one afternoon, but not enough to form an opinion even as to the details of any one plan or elevation, simply because I have not seen them—only two or three drawings out of a set. My printed paper, called "Remarks, &c.," was *not* sent to the town clerk for distribution, as Mr. Reid asserts, nor would the town clerk permit anyone on my behalf to look at any of the designs or to take any notes. So I was and am dependent entirely for my information to Mr. Reid and others who publish it, and have not had any but the most formal communication with the town clerk, and have neither seen that gentleman nor any one of the Council from the time Mr. Waterhouse was expected to the present hour. It is totally unfounded and untrue that any or the slightest influence has been privately exerted in any way by me, or in my behalf, that I am aware of. What I have printed has been in Mr. Reid's possession some time, and a copy was in the hands of the editor of every Plymouth paper at the earliest moment to prevent any idea of private influence, which is now suggested by one who knows a great deal about local tactics, but assumes to possess more information on other matters than he really does.

I begin to look on all competitions as the *debris*, or broken matter, and hard, objectionable fact as material thrown down in soft places whereupon we may hope one day to see a hard and fair roadway leading to some proper law, regulation, or custom in competitions whereby much of the present unsatisfactory conduct of them and the competitors themselves may be avoided; and if at present we who compete are spattered with some of the mud while the hard core is being laid, perhaps we must not complain, but it will be our own faults if we do not in good time make a sound road. This Plymouth competition provides some rugged, hard material difficult to appreciate as useful except in this; but personalities have no use, and only serve to spoil the work and discourage, as well as discredit, the workmen.

I have occupied too much space to add more now on the general question.—I am, Sir, &c.,

Feb. 22, 1870. C. F. HAYWARD.

P.S.—I may be allowed to state my satisfaction that "Nina"—by whatever mistake—receives as much premium as "Ich Dien," and I only regret that "Fiat Justitia's" first premium is, according to a vicious system, "merged in the commission"—for as they are making a fresh design, they surely deserve the premium for the first one.

[We have received a long letter from W. H. Lynn on this subject, which will appear in our next number, when the controversy, as far as our pages are concerned, must close.—ED. B. N.]

CHESTERFIELD STEEPLE.

SIR,—I am inclined to think with you that the last version given in this week's number respecting the distorted nature of the above ungainly structure is the most correct. The spire being of oak covered with lead, the action of the weather on the former material is so well known to us all, that it requires but a very slight stretch of imagination to come to the conclusion that the oak being green when used, has twisted "all ways" from the effects of the sun and other atmospheric influences, and caused the steeple to be the unsightly affair it now is. Barnstaple Church, in Devon, boasts of a similar, although smaller spire, constructed in like manner of oak and lead, and warped as much as that at Chesterfield. It was struck by lightning in 1816. During the recent restoration of the church, the inhabitants of Barnstaple were unanimous in their desire to have this crooked spire pulled down, but Mr. Gilbert Scott, their architect, would not hear of it. That gentleman designated it "a gem." He is an high authority whose opinion must be respected; but he is the only person I ever heard speak in its favour. The most striking feature about Chesterfield is, that from whatever side it is viewed it appears toppling over towards the spectator; this is occasioned by the fact of its being out of the perpendicular in one direction for a certain height, and then shooting off at another angle for the rest of the distance to the top. In this only, and in the remotest way possible, does it resemble the Leaning Tower at Pisa, which, as is well known, is a circular tower of white marble, consisting of six stories or galleries with open arcades running round their outsides, and terminating on the summit with a bell chamber of about two-thirds the diameter of the rest of the structure. The tower is about fourteen feet out of the perpendicular at the extreme edge below the bell chamber, which latter, as if to counteract the effects of such defective construction, is built at an angle leaning the *reverse* way. This being at a considerable altitude looks somewhat slight from the ground, but is very distinct on close examination. The hanging of the bells, by-the-bye, is very properly arranged so that the lightest are on the overhanging side of the tower. The Pisa tower, although scarcely handsome, is not such an eyesore as the Chesterfield steeple, and it occupies a more secluded position than the latter, whose withered proportions can be seen from everywhere in the town. I have noticed a very successful twisted spire on a church at Dijon, in France, delicate beyond measure; and cleverly carried up with the strictest regard to geometrical nicety and proportion. It is just possible that the architect of Chesterfield had a vague notion of a similar nature, but if ever he flattered himself upon accomplishing a parallel feat, he must have been most wofully dissapointed on beholding the frightful results of his ambitious efforts. J. V.

THE HOUSES OF PARLIAMENT AND THE BOARD OF WORKS.

SIR,—I am glad to find that the Houses of Parliament are to be placed under the care of the Board of Works, and hope the deterioration of the building which has been going on of late years, by additions and alterations, will thus be put a stop to, or at least abated. Whoever may have been the designer of the main structure, certain it is that similar talent is not possessed by the author of the late works, and it is lamentable to see a fine building thus messed with and spoilt. It is the fashion now to decry all but thirteenth century Gothic, and many affect to sneer at the Houses of Parliament; but I am sure there is no man among the R.I.B.A.'s who could equal them. Is it known how much money has been spent in the foolish attempt to convert the old crypt into a chapel and baptistry? It was not required for anyone, or for any purpose, but seemingly done for the express pleasure and profit of the architect. There was not even the excuse of that mischievously known thing, a restoration, for no one can say there was a chapel and baptistry there before. Now it is converted, there is no one to officiate in it, and certainly it would be difficult to find subjects for the christening process! Are there any little Bills born in the Houses save those which have their origin in the Parliamentary way? As regards the resident officials, even if they had been people of consequence, no special provision for their worship was necessary, considering that the Abbey and parish churches are but the other side of the road. If it is necessary to retain the services of an architect, I should like to engage him in the Chinese fashion of stopping his salary when work was being done, and so remove from him the fatal temptation of having to make work for himself.—Yours, &c., M.

THE INSTITUTE AND THE ROYAL GOLD MEDAL.

SIR,—The Institute of British Architects, it seems, design the Royal Gold Medal this year for Mr. Ferrey. Her Majesty is supposed to have given this medal in keeping of the Institute for those who have specially distinguished themselves as architects, or in some way furthering the art. Can you tell me, Sir, in what way it can be said that Mr. Ferrey has established a claim to the honour of royal recognition and reward? He is no doubt a very respectable man, but as an architect is certainly not above mediocrity.

If the medal is to simply go the round of the members of the Institute, then, as a facetious Fellow openly expressed it, "we shall all have it in time." But the question may arise, whether it was worth while for Her Majesty to establish such an equivocal sign of merit? If there were no better men than Mr. Ferrey, though the fact would be lamentable, the Institute would be excused. But there are. There is J. H. Parker, who, by the numerous works he has edited and published during the last thirty years, and by his *con amore* labours as an archæologist, has done very much for the advancement of architecture, especially the Gothic phase of it. There is John Ruskin, to whom, for the glowing poetic interest he has thrown over the art and the attention he has drawn towards it—raising it in the estimation of the general public—the profession is immensely indebted. Others also could be named. Inasmuch, however, as the Institute had not discrimination enough to see the merits of a Pugin and a Britton, what can we expect?—Yours, &c., M.

DR. ZERFFI AND THE HISTORICAL DEVELOPMENT OF ART.

SIR,—It seems to me that the lectures of Dr. Zerffi, which appear in the last number of your journal, are little else than a tissue of falsehood and nonsense. For instance, he speaks of the Jews being "forbidden by law to carve or engrave." They were only forbidden to make idols. The description of Solomon's temple, with its seraphim, lions, oxen, palm trees, pomegranates, and lilies, plainly proves that the sculptor's art was permitted for proper purposes. This building being divinely commissioned, to say that the Jews had a "horror of building" is sheer nonsense. He says too, that Jews are "never picture painters;" a great mistake, for many well-known artists of the present day are Jews.

Then with Greek art. Its origin and excellence he finds in the "great extent of its sea boundary." The geographical configuration of its coast is the same now as then, but where is its art?

He says "the Doric order rose in the north," instead of which it appears to have begun in the south. It has been traced to Egypt, and was probably, with the other styles, perfected at Athens. There is no warranty for saying that the Greek temples were at first exceedingly plain in their interior, and subsequently excessively ornamented, and so far from the Doric being marked by simplicity and plainness, the Doric Parthenon surpassed all others in Greece, if not in the world.—Yours, &c., P. E. M.

THE VILLA IN S. JAMES'S PARK.

SIR,—I am induced to write a few lines to you, not so much on the artistic merits of the above-named building, about which there could not be two opinions, as in reference to some propositions made by "W. W.," when writing on this subject in your last number.

In his letter he advises that, to prevent the appearance of future architectural monstrosities, there should be appointed by Government "a department of acknowledged ability," to which not only drawings but also full specifications of proposed new works should be submitted for approval;—or words to that effect.

It seems to me, and I think most students of art will agree with me, that the results of such a system would be most pernicious. The "department" of course would have its own particular and favourite style, and would, if it could, enforce the adoption of that style to the eventual exclusion of all others. How would architects like all styles but one to be tabooed, though that one be supposed perfect by its advocates? Is it desirable (though each has its good points) that the style of the existing Science and Art Department, or Baron Haussmann's style, or any other style, should be universally adopted? No; far better the present circumstances. Now, genius has its opportunities as well as mediocrity; under the proposed regime all freedom of thought in design would be speedily stamped out.

The only true remedy for present evils is that architects themselves should be required to pass through Government examinations, both in knowledge of practical work, and in theoretical acquaintance with the characteristics of the various styles, and should then be furnished with diplomas leaving them free to use their acquired knowledge in what individual direction they pleased. This is most necessary for both the comfort and safety of the public, and till it is done there will always be ignorant and unscrupulous persons in the profession who will not be prevented from outraging good taste even by selfish considerations.

Hoping you will lend your powerful aid to press this scheme more closely upon the attention of the public.—I am, Sir, yours, &c., M. M. G.

P.S.—I am aware of the present existence of voluntary examinations, but of course they do not answer the purpose; they should be compulsory on all.

BRADFORD TOWN HALL.

SIR,—Your print of this week's issue affords me an opportunity of seeing the much-talked-of prize design for above, and I am shocked to perceive at a glance that the whole treatment of the façade is a reduced, and certainly an unworthy, copy of the noble design of Messrs. Speakeman and Charlesworth for the Manchester Town Hall. Can any satisfactory explanation be given of this self-evident fact?

I am sure my feelings will be shared by all who are acquainted with the two designs, and that the public would be relieved by such an explanation as may remove the disagreeable impression produced by your publication of Messrs. Lockwood and Mawson's design.—Yours, &c.,

AN IMPARTIAL SPECTATOR.

ART WORKMEN'S COMPETITION.

SIR,—After reading your criticisms on the above competition, I visited it, and I certainly thought the major part was good, especially so when I consider that in most cases they have to be executed after working the usual time of ten hours; but, like yourself, I felt the want of the original, so I went straight to the Kensington Museum and made a long search after panel No. 1, but could not find it. But I came across the entablature of chimneypiece. I was surprised to think that such a specimen had been chosen. The photograph hung in the Society's room flatters greatly. The foliage is not like that of the vine, and if I had to make a choice it would be in favour of the one carved by C. H. Line, the chief fault of which seems that it is too naturalistic. I write this quite impartially, not knowing anyone connected with the competition, but in order to lead others to visit the original, like myself. In my opinion, it would have been better for the Council, in their programme, merely to have said an entablature for a chimneypiece, composed of satyrs and vine, allowing the carver to use his own ideas. W. H.

ARCHITECTURAL DICTIONARY.

SIR,—Amongst the advertisements in your paper there lately appeared one containing the arrangements of the Architectural Publication Society for the completion of their dictionary, and the different modes by which subscribers could pay their moneys and receive their copies. Being one of the number that in these hard times cannot well spare £15 at one subscription, I am glad to find the society prepared to meet such cases. But it does not appear quite clear to me from the advertisement what time is allowed to complete the sum, and what is the lowest sum allowed for any one year.

The Dictionary, incomplete as it is, has, I think, become generally to be recognised as the most reliable work of reference on all architectural matters, and it would be satisfactory to learn from the conductors that it is intended to complete the remainder as carefully as the earlier portion and that the illustrations will be of equal merit to those already published.

I observe that the plates have been produced rather as the subjects were forthcoming than in strict connection with thet letterpress, and would suggest that as soon as possible a list of the plates in their order should be furnished by the editor which would become a guide for the binders in arranging the parts for binding. It would also be advisable that a scheme should be drawn up showing how the whole might be divided into volumes of moderate bulk for the sake of those who prefer to have the earlier parts bound for convenience of reference and more careful preservation.—I am, yours, &c.,

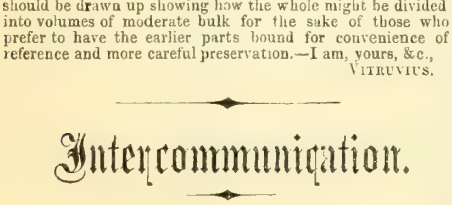
VITRUVIUS.

Intercommunication.

QUESTIONS.

[1781.]—MEASUREMENT OF GLASS.—Are laps correctly measured in a greenhouse, for instance, or is surface measure alone correct; or does custom vary with the location?—X.

[1782.]—ECHO.—I should be much obliged if some correspondent would inform me how (in a practical manner) to destroy the echo in a building, as per sketch. The walls are

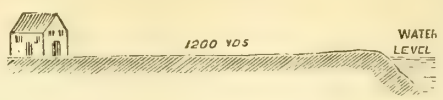


finished in stucco; the gallery was added with a view to lessen the echo, which it has to some extent done, but at the present time the voice sounds as if rattling against wall at A; this wall has been covered with sacking inside, and this has proved a partial remedy; sacking has also been hung from each principal about 5ft. down; this proved useless, as did several other similar experiments. The building is about 70ft. long by 40ft. wide, and 28ft. high to the plate.—INQUIRER.

[1783.]—SHOP STOVE.—What is the best apparatus for use in a joiner's workshop, to heat glue without scorching it, and that with a small amount of fuel can be kept alight all day?—INQUIRER.

[1784.]—CLEANING VARNISHED SEATS.—I have a quantity of deal seats to re-varnish; they are in some places coated with a kind of pasty black, and in some rubbed quite smooth by contact with dresses. What is the best way to prepare them for re-varnishing?—INQUIRER.

[1785.]—DRAINAGE.—Is it desirable to construct a sewer or good sized drain from premises at some distance from a running stream? The fall is very slight, being not much more than is obtained by taking the difference between the ordinary level of the stream and that of the surface—*vide* rough sketch. Will any experienced reader advise as to the best method of effecting complete drainage, as it is becoming



a serious matter? Cesspools are objectionable.—A SUBSCRIBER.

[1786.]—VOLUME OF WATER.—Would any of your readers give me any information on the following? What would be the effect on a volume of water contained in a reservoir 200′ × 200′ × 15′, the water to remain in a state of stagnation as regards influx, but 20,000 gallons per diem to be drawn off; and what result of small influx, say 30,000 gallons per month?—G. P.

[1787.]—ARCHED ROOFS.—In your paper three or four weeks back you gave some accounts of arched roofs. Will you please allow me to ask, through THE BUILDING NEWS, how to work out the strains in this kind of structures? I think it will be a very interesting subject for your readers as well as for—CALCULATOR.

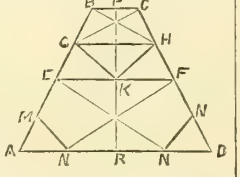
[1788.]—LONDON UNIVERSITY.—Perhaps some of your correspondents would kindly inform me what is the course of "Architecture" in the University of London? Also, in what other English universities is there a school and course of the same, and if it is necessary to matriculate and pass the ordinary "Arts" entrance?" Is there a license granted, as in the engineering course?—DOUBLE YOU BEE, Sandymount.

REPLIES.

[1758.]—MEASUREMENT OF STONE WALLING.—Everything depends on locality. In some places the only known definition of perch would be "a fresh water fish." In the south of England the perch in use contains 16½ft. superficial, in the west 18ft. superficial. "J. L. M." says "a square pole or perch contains 30¼ square yards, or 272¼ square feet," although contending that the term perch is obsolete,—the above quantity is known technically as a rod—and follows with "*so that the work can easily be measured up.*" The yard superficial in vogue in the majority of places out of London certainly recommends itself as the most simple for all walling. The reduced system is, I think, applied almost solely to brickwork.—F.

[1767.]—REMOVING INK LINES AND COLOUR FROM DRAWING PAPER.—Moisten the portions to be removed, dry with blotting paper, and clean out briskly with india-rubber. Practise on an old drawing first if unaccustomed to the method.—F.

[1769.]—CONSTRUCTION OF ROOF.—In THE BUILDING NEWS for the 11th inst., I see that an answer is given to this question which belongs properly to the next, or "Framing of Partition." I enclose a sketch of the manner in which I should construct the framing of the roof in question. I should make the struts of timber, and the ties of round bar iron. They are shown in the sketch by thick and thin lines respectively. A B, C D are the principal rafters, which could not be less than 12″ × 6″. The two collars E F, G H would equal each 9″ × 4″, and the small struts M N, G K, and H K might be of timber 6″ × 6″. The tie rods A D, P R should be of round iron 2″ in diameter; those shown by the letters N E, N F of 1¼″ round bar, and G C, H B, of ¾″ in diameter. It would be far better to construct the roof of iron altogether, as it would be much lighter. It will be much too weighty if built of wood to place upon walls only 14″ thick, as shown in the question.—L. P. L.



[1770.]—FRAMING OF PARTITION.—Vote for Fig. 1.—F.

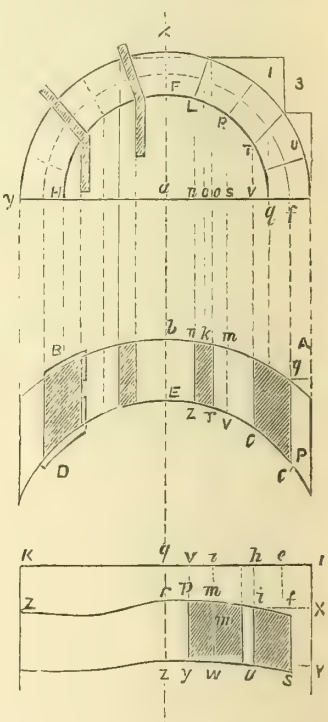
[1770.]—FRAMING OF PARTITION.—In your issue of February 11th, "The Working Mechanic" asks if some one will settle the question he has furnished and explained in your Intercommunication column. "C. W. R. E. D." has given his ideas with reference to the question, which are an improvement on Fig 1, yet I cannot say that I agree with him. Firstly, take Fig. 1, or "Foreman's" method. Supposing the sectional mark A to represent the principal beam or weight to be carried, evidently it is best; yet, as "C. W. R. E. D." shows, it is desirable to have a better footing for the blades. It might easily be attained by taking a partial bearing on the girder with sufficient tenons into king-post to keep them in their places, instead of introducing the very unsightly post "C. W. R. E. D." proposes, to say nothing of cutting to disadvantage, and extra labour. As the "Clerk of Works" says, he has yet to learn how an inverted truss can carry any weight without spreading. So far as timber goes, no doubt he is right; but, judging from this case, the sectional size of the girder appears to be 18″ deep, so what need is there to fear from spreading, for, in the present case, the king-post cannot be in tension; it is possible for the blades to be so, and that is the only advantage No. 2 has; but if there is not sufficient support for them, as I infer there is not from the sketch, far better give them a good footing and judicious fixing at top, so as to ensure a concentration of the weight on the seemingly strong girder. The question simply is, which plan is the best? but "C. W. R. E. D." goes so far as to suggest the introduction of a wood girder with flitch plate, which I fear would be tampering with the specification. Yet his plan would not do, as it is not wise to have the soffit of a beam and joists on the same level; by so doing he would in course of time find cracked ceilings and cornices. I agree with "Foreman."—T. S. S., Rugeley.

[1772.]—CIVIL ENGINEER'S PUPIL.—Your "Pupil's" question is rather a puzzler. The duties of a pupil are to do what his master tells him. The duty of the master is to teach his pupils their profession, a duty which the majority of them certainly do not do. As a rule the pupil is left to shift for himself, and pick up such stray bits of information as he can. A young man has a much better chance of really learning his profession by becoming the pupil of an engineer with a moderate practice than by entering the office of one of the "great guns," who have something else to do than bother their heads about the pupils.—A. C. E.

[1774.]—CIRCULAR RAIN WATER TANK.—"Sandysarms" wants to ascertain the cubic contents of a circular tank, and states he cannot find any rule in his books that gives him the information. It would be a curiosity to see a list of "Sandysarms's" books that fail to give the information that most schoolboys know—viz., "how to find the area of a circle." I will answer his question. Square the diameter, and multiply such square by ·7854; this will give the area, which, multiplied by the depth, will equal the cubic contents 12′ 4″ × 12′ 4″ × ·7854 = 119·38 × 30′ 0″ divided by 27 = 132⅔yds nearly.—W. R. A., Uckfield.

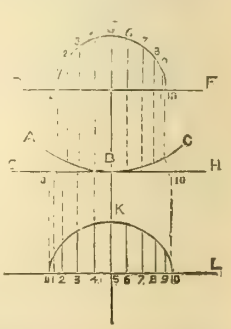
[1774.]—CIRCULAR RAIN WATER TANK.—The rule to find contents of tank is area of base × perpendicular height. Area of base = diameter squared × ·7854; therefore contents of above tank = (12′ 4″)² × ·7854 × 30ft. = 4563·3 cubic feet, or 169 cube yards.—W. J. C.

[1779.]—UNANSWERED QUERY.—CIRCULAR ARCH IN CIRCULAR WALL.—"Young Stonemason" complains that this question has not been answered. It is not easy in the small columns of Intercommunication to answer questions that require to be drawn out to a large scale to make them understood, but the enclosed I send. Let A B C D be the



plan of the circular wall; bisect the arc A B, and through the points draw E F parallel to the jamb A C or B D—through any point *a* in E F draw G H perpendicular to E F, produce the lines C A and B D to meet G H in the points G H, and G H will be bisected in *a* from *a* as a centre, and with the radius *a* G or *a* H describe the semicircular arc G F H; also describe the arc of the extrados, and divide the arcs into five equal parts, and let fall the perpendicular faint lines, and those of the middle soffit curves to the inside circular line C E D. Having extended the arcs of the intrados curve on the line I K, and having drawn the lines of the soffits and those in the middle, lay off the distances between the right line G H and the circular outside line A *b* B—viz. G A on I X and on K *i* Z, *e d* on *e f*, *v g* on *h i*, *s h* on *b m*, &c., &c.; then trace the front curve on the soffit X *r* Z. To find the rear curve, lay G C on I Y, *c* C on *e* S, &c., by which the curve will be obtained.—W. R. A., Uckfield.

[1779.]—ARCH UPON CIRCLE.—If by this somewhat quaint term "Young Stonemason" means the reduction to a plane of an arch in a cylindrical wall, perhaps the following may assist him:—Let A B C be the cylindrical wall, or circle, and D E F the perforating arch. Divide the circumference of this into parts, as 1 to 10, and from the divisions drop ordinates upon the diameter D F. Let the seats of those ordinates be set upon A B C. Draw a straight line G H at right angles to the diameter of the cylinder, and fixing the compasses at B, transfer by arcs the seats of the ordinates from A B C to G H. Then to obtain the flattened elevation, draw J L as a base, and raise upon it the ordinates 1 to 10 of the same height as in D E F, and connect their tops by the curve J K L, which represents in a flattened state the arch upon circle.—DRAUGHTSMAN.



STAINED GLASS.

HETHE.—The Roman Catholic church at Hethe, near Bicester, has lately received an addition in the shape of a stained glass window, erected in memory of the late Mrs. A. W. Collingridge. It consists of two lights, arranged with three panels in each, containing respectively half-length figures of S. Thomas Aquinas, S. Dominic, S. Vincent de Paul, and blessed Joseph Labero, with full length figures of S. William, Archbishop of York, and S. Elizabeth, Queen of Hungary. At the bottom of the window is an inscription. This is the fifth window that has been erected in this church by the members of the Collingridge family, all of which have been supplied by Mr. Francis Barnett, of the Edinburgh and Leith Stained Glass works, Leith.

WATER SUPPLY AND SANITARY MATTERS.

THE LEA RIVER.—The conservators of the river Lea have given notices to the local authorities of the towns and districts draining into the river to adopt other modes of disposing of their sewage before next June. A penalty of £50 will be incurred for every day after that period in which the authorities of any place allow sewage to go into the river.

SEWAGE IRRIGATION AT HORNSEY.—The Hornsey local board have decided on adopting a system of irrigation for the disposal of the sewage of the parish. The plans of Mr. Latham, C.E., had been adopted, the cost of the works being estimated at £18,000 for internal, and £8000 for drainage without the parish, and that of the two other engineers, Mr. Shield, £22,000, and Mr. Measom £35,000 for whole, and £26,000 for internal. Some months ago a notice had been served on the board by the conservators of the river Lea, in which it was stated that after thirteen months, which will expire in August, no sewage matter is to be discharged from the parish into the river, under a penalty of £100, and £50 per day after the expiration of the notice. It is intended to apply for Parliamentary powers to carry the sewage to land without the parish: and for the delay, which will extend to eighteen months, it is proposed to apply to the Lea Conservators for an extension of time.

THE CONSTRUCTION OF HOUSES AS AFFECTING MORTALITY.—Dr. Gairdner lately delivered before the Glasgow Philosophical Society an able address "On the Defects of House Construction in Glasgow as a Cause of Mortality." The lecturer, after showing the moral and physical effects resulting from over-crowding, said that, taking the family as a unit of society, it was essential for the well-being of society that its houses should allow the development of family relations. In such houses he considered that the following eight points should be specially attended to:—1. Sufficient cubic space in sleeping rooms (the legal minimum at Glasgow is 300 cubic feet for every person above eight years old), to secure which it will be necessary to make the *owners* instead of the *occupiers* responsible for overcrowding; 2, arrangements for proper separation of the sexes, which means, of course, a rather general condemnation of single room occupancies; 3, proper means of access, instead of the dark, ill-ventilated common staircases of the large "flatted" houses; 4, proper lighting and ventilation of inhabited rooms—a requirement which would prevent the habitation of most underground rooms; 5, adequate privy accommodation, taking care that the "privy" is also private, a condition often not carried out in Glasgow, it seems; 6, good water supply; 7, baths and washhouses, not at a distance, but on the premises; 8, airing and recreation grounds. This last condition, in reference to a town in some parts of which, Dr. Gairdner tells us, there are from 600 to 1000 inhabitants per acre, sounds very much like asking for a general demolition of multiple occupancies within vast tenements as existing in Glasgow. Such demolition will doubtless be effected in time, and the sooner the better, if sufficient accommodation be provided somewhere else.

A BILL for the regulations of the sanitary laws of the State of New York has been introduced into the United States House of Representatives.

THE ROTUNDA HOSPITAL, DUBLIN.—Dr. Evory Kennedy has laid before the Board of Governors of this hospital a proposal for improving the sanitary condition of the hospital by isolating the wards as much as possible by means of external galleries of communication open to the air. It is to be regretted that the proposal did not even find a seconder, for the death rate for the fifteen years ending in 1868 amounted to the excessive proportion of 1 in 33⅓, owing to the imperfect means of keeping the wards free from infection.

LAND AND BUILDING SOCIETIES.

NATIONAL FREEHOLD LAND SOCIETY.—The annual meeting of the members of this society took place at the Guildhall Tavern, Gresham-street, on the 11th inst. Mr. W. E. Whittingham, the secretary, read the minutes of the previous meeting, which were confirmed. The directors' twentieth report was taken as read. The Chairman, in moving that the report be adopted, referred to the long period of success enjoyed by the society, which was almost uninterrupted, notwithstanding the great crash of 1865-6, and the consequent distress and want of confidence succeeding. The capital now exceeded a million, upwards of £90,000 had been advanced during the year, and £5000 added to the reserve fund. There was no building society in the kingdom equal in magnitude to theirs. Hitherto their losses had been most insignificant, the whole not exceeding 8s. per cent. on the capital, taking the average of years. It was the part of wise men, however, to provide for every possible contingency, and therefore the directors had added £60,000 to the convertible securities, the amount being invested in Consols or new Three per Cents. With respect to a bonus, they had had a good year, and would have been glad if they could prudently have paid one. The directors believed that a bonus might safely be declared every other year, and this he thought ought to satisfy the members.

WORCESTER BENEFIT BUILDING SOCIETY.—The eleventh annual meeting of this society was held on Monday week. Mr. W. H. Walker, Secretary, read the report, from which it appeared that the operations of the society had been most successful, and more than realised the hopes held out in the prospectus issued at the formation of the society. The gross profit, including the amount brought forward from last year, was £1999 8s., and that, after placing 1½ per cent. to the credit of investing members' accounts, nearly 6 per cent. to the credit of borrowing members' accounts, and discharging all current incidental expenses, the balance of Reserve and Deferred Premium Fund amounted to £241 8s. 8½d., a feature which the committee confidently pointed to as calculated to give great confidence in, and stability to, the society.

FAVERSHAM, SITTINGBOURNE, AND LATHE AT SCRAY BUILDING SOCIETY.—The report presented at the nineteenth annual meeting on the 7th inst. showed that £1600 had been advanced on property during the past twelve months, and about the same amount had been returned on shares withdrawn as completed. The assets were computed at £10,938 19s. 7d., and the liabilities at £8379 17s 6d., leaving a balance in favour of the society of £2559 2s. 1d.

LEICESTER.—The seventeenth annual meeting of the Leicester Permanent Benefit Building Society was held on Monday week. The directors again report an increase in the number of shares held in the society, as also in the amount of money received during the year; although, owing to the unsatisfactory state of trade in the town for the last few months, the number of withdrawals is considerably larger than in former years. During the year 1008¼ new shares have been issued. 440 have been withdrawn, 8 have been forfeited, and 73½ invested and 86½ advanced shares completed, leaving a total of 5212½ shares on the books at the close of the seventeenth year; being an increase of 400 in the year.

LEGAL INTELLIGENCE.

BREACH OF THE BUILDING BYE-LAWS IN LEEDS.—Mr. Fowler, the Borough Surveyor, attended recently before Mr. Bruce, the stipendiary magistrate, in proof of an information laid against Mr. John Jagger, cloth manufacturer, for an infringement of the building bye-laws. It appeared from the statements of Mr. Fowler and the buildings inspector (Mr. Hainsworth) that the defendant is having erected a number of houses in Northfield-terrace, and that with respect to one named in the information the chimney had not been pargetted with mortar, and that it would be impossible to do it properly without pulling it down. The Borough Surveyor added that many of the flues had not been pargetted, but he had only taken out the summons for one. Defendant said that the men were employed on the work when the frost set in, and they were not able to proceed with it until it broke. He called Mr. Christopher Gale, the contractor for the joiners' and bricklayers' work, who said that he sub-let the brickwork, and the man had slipped the pargetting, but as soon as he found it out he had it done. The Borough Surveyor said that the Corporation had great difficulty in getting this kind of work done, and remarked that the defendant had rendered himself liable to a fine of £5, and asked for a substantial penalty. Mr. Bruce decided to hear another information, charging the defendant with having allowed the floor joists to enter the flues, before giving his decision. Defendant: The contractor tells me there are no joists in the flues. The Borough Surveyor: I can call the inspector to prove it. It appeared, however, that the Borough Surveyor was unable to point out a penalty for this offence in the Act. Mr. Bruce said it was no use convicting if there was no penalty. Defendant: The contractor tells me that there is no such joist within nine inches of the flues. Mr. Bruce: The most material thing for you is that there is no penalty. The summons in this case was accordingly dismissed. On imposing a fine of 20s. and costs on the first information, Mr. Bruce remarked that, unfortunately, many houses in Leeds were a discredit to the town.

Our Office Table.

INSTITUTION OF SURVEYORS.—At the ordinary general meeting, held on Feb. 7, the adjourned discussion on the paper by Mr. E. Smyth, entitled "The Enfranchisement of Copyholds of Inheritance," was resumed and concluded. The following candidates were balloted for and declared duly elected, viz.—As Members:—William Blount, Orchehill House, Gerrard's Cross, Bucks; Francis Field, Oxford; John Lees, Reigate; James Martin, Wainfleet, Boston, Lincolnshire; James Rawlence, Salisbury. As Associates:—Ernest Carritt, 16, Basinghall-street, E.C.; George Henry Tatham, 14, Cockspur-street, Pall Mall; John Wigram, Bromleys, Harlow, Essex.

INCORPORATED SOCIETY FOR PROMOTING THE ENLARGEMENT, BUILDING, AND REPAIRING OF CHURCHES AND CHAPELS.—This society held its usual monthly meeting on Tuesday, at the society's house, No. 7, Whitehall, S.W. Grants of money were made in aid of the following objects, viz:—Building new churches at Newcastle-upon-Tyne, S. Philip's, and Great Wollaston, in the parish of Alberbury, near Welshpool, Salop; enlarging or otherwise increasing the accommodation in the churches at Buckhorn Weston, near Wincanton, Dorset; Forton S. John's, in the parish of Alverstoke, Hants; Longdon, near Rugeley, Stafford; Sarnesfield, near Kington, Hereford; Towednack, near Hayle, Cornwall; and Wolverhampton, S. Andrew's. Under very urgent circumstances the grants formerly made towards building the church at Perry-street, in the parish of Northfleet, near Gravesend, and towards reseating and restoring the church at Burrington, near Chumleigh, Devon, were each increased. Two or three applications for assistance towards school churches were unavoidably rejected at this meeting, and the consideration of them reluctantly postponed, in consequence of the special fund for such buildings being entirely exhausted.

IRON RUST.—Professor Crace Calvert, of Manchester, has recently communicated to the Chemical Society the results of some curious experiments upon iron rust. Two samples analysed by him were found to contain over 6 per cent. of protoxide, so that we must no longer consider that substance as consisting entirely of sesquioxide. His experiments seem, moreover, to contradict the current belief that the rusting of iron is entirely due to moist oxygen. Neither dry nor moist oxygen appears to have any action, and the only experiments in which the ordinary rapid oxidation of the iron was observed were those in which the metal was exposed to the joint action of water, oxygen, and carbonic acid. The same results were obtained whether the iron was immersed in air or water.

SLACKNESS AMONG THE BUILDERS OF SYDNEY, N. S. W.—A correspondent writes that owing to the abundance of money and to low prices of building materials, so much capital has been fixed in bricks and mortar as to bring down rents fully 15 or 20 per cent. This, it is thought, will be some inducement to intending emigrants, although rents are still twice what they are in the most fashionable London suburb.

ASSOCIATED ARTS' INSTITUTE.—On Saturday last the second conversazione of the season was given by this society at its rooms, 9, Conduit street. The gallery of the Society of Female Artists was thrown open for the occasion, and proved a source of much attraction, the works exhibited showing a marked advance on those of previous years, and including pictures by Rosa Bonheur and other lady artists of eminence. There were also on view various works by members of the Institute, and a fine display of the Autotype Co.'s reproductions. The rooms were well filled. Among those present were Professor Westmacott, R.A., President; Mr. Gilbert Scott, R.A., Sir Duffas Hardy, Professor Brewer, Professor Ansted, F.R.S., Mr. and Mrs. Thornycroft, Mrs. Gliddon, Mr. Fredk. Tayler, President of the old Water Colour Society; Mr. Cave Thomas, Mr. Hepworth Dixon, Mr. A. B. Donaldson, Mr. Montgomerie Ranking, Mr. Sutherland Edwards, Mr. Phené Spiers, &c. An excellent vocal and instrumental concert was given during the evening, in which Miss Banks, Miss Palmer, Mr. Plater, Signor Nappi, Mr. Sceales, Mr. Casserley, and Mr. Lauber, were the performers.

Chips.

The first street railway in Philadelphia was laid in 1857. The present number is 16, and the combined capital is about 12,000,000 dollars, of which nearly one half is paid in. A total length of track in 1857 of five miles has been extended, until now it is more than 200 miles long.

The Hanging Committee of the forthcoming Royal Academy Exhibition (the "Athenæum" states) will be composed of Messrs. Hook, Elmore, and Sant; the last being, according to the rule, the latest elected member of the Academy. The Selecting Committee will comprise those who were hangers of last year's Exhibition, viz., Messrs. Watts, Leighton, and Hart.

It was decided by the General Purposes Committee of the Manchester Corporation on Monday, that all powers to lay down tramways in the city ought to be conferred upon the municipal authorities responsible for the maintenance of the highways, and that all Bills otherwise promoted should be opposed.

The cement trade seems to be looking up on the Tyne. Last week Lieut. Colonel Addison Potter completed the erection of large mills at Willington Quay. The works will be known by the name of the Tyne Cement Works, and are fitted up with machinery which reduces hand labour to a minimum. Another cement-making firm is establishing a place at S. Peter's.

The motion at the Institute to limit the period of the Hon. Secretary's eligibility to hold office was lost by a large majority.

The Board of Management of the Sheffield General Infirmary have determined to build a detached wing for the treatment of infectious or serious cases.

MEETINGS FOR THE ENSUING WEEK.

MONDAY.—Royal Institution of British Architects. An Account of some Original Drawings by Italian Architects. By Professor Donaldson, P.P.

TUESDAY.—Institution of Civil Engineers. Discussion upon "The Mhowke Mullee Viaduct and the Pennar Bridge. 2nd. "The Wolf Rock Lighthouse." By Mr. J. N. Douglass. 8.

,, Royal Institution. "On Plant Life as Contrasted with that of Animals." By Dr. Masters, F.L.S. 3.

WEDNESDAY.—Society of Arts. "On the Causes and Consequences of High Charges for Passengers by Railway, and the Advantages to be Expected from an Adoption of Low Fares." By G. W. Jones, Esq. 8.

THURSDAY.—Royal Institution. "On the Chemistry of Vegetable Products." By Professor Odling. 3.

,, Linnean Society. 8.

,, Society of Antiquaries. 8.30.

FRIDAY.—Royal Institution. "On Ironclad Ships." By E. J. Reed, C.B. 9.

SATURDAY.—Associated Arts Institute. "The Position and Claims of Architecture as a Fine Art." By H. C. Boynes 8.15.

,, Royal Institution. "An Introduction to the Science of Religion." By Professor Max Muller, M.A., LL.D. 3.

Trade News.

TENDERS.

KNOWLE HILL, TWYFORD, BERKS.—For the erection of a new chancel to the church of S. Peter, Knowle-hill. Quantities supplied. Fredk. Rogers and William Scott Champion, architects:—

Silver & Son	£695 0
Wheeler	680 0
Honour & Caske	592 10
Wall & Hook	540 0

Accepted.

S. LUKE'S.—For Houseless Poor Asylum, Banner-street, S. Luke's. Mr. R. Hesketh, architect. Quantities supplied by Mr. J. W. Forge and Messrs. Franklin and Andrews:—

Warskitt	£6840
Newman and Mann	6635
Axford and Whillier	6452
Brass	6394
Holland and Hannen	6345
Myers	6335
Cowland	6226
Ashby and Sons	6184
Pritchard	6173
Henshaw	5984
King and Sons	5869
Browne and Robinson	5820
Perry, Brothers	5447

SURREY.—For alterations and additions to Ripley House, Ripley, Surrey. James K. Colling, architect:—

Hills	£1875 0 0
J. and A. Wright	1575 0 0
Spicer	1574 0 0
Jarrett	1487 0 0
Harris	1475 10 0
G. and J. Wood	1470 0 0
Farley	1365 0 0
Saunders and Beevers	1360 0 0
Todd and Sanders	1225 0 0
Lammie and Co.	1163 0 0

WALSALL.—For the erection of infants and girls' school, with mistress's residence, for the Committee of St. Peter's parish. Messrs. Nichols and Chamberlain, architects:—

Briley, Birmingham	£1625 0 0
Wilkes, Darlaston	1540 0 0
Jeffrey and Pritchard, Birmingham	1482 0 0
Trow and Sons, Wednesbury	1473 0 0
Hitchen, Thepleck	1450 0 0
Nelson, Dudley	1440 0 0
Fisher, West Bromwich	1391 0 0
Thompson, Wolverhampton	1370 0 0
Taylor, Walsall	1349 0 0
Stockton and Son, Oldbury	1343 0 0
Rowley, Walsall	1300 0 0
Adkins, Walsall*	1274 10 0
Holland, Dudley	1270 0 0
* Reduced estimate (accepted)	1193 15 0

WALWORTH.—For S. Stephen's Church, Villa-street, Walworth. Mr. H. Jarvis, architect:—

Downs	£6546
Marsland & Son	6400
Thompson	6327
Henshaw	6082
Merritt & Ashby	6000
Higgs	5983
Carter	5870
Perry	5845
Longmire & Burge	5804
Colls & Sons	5784
Dove Bros.	5635
Myers & Sons	5419
Tarrant	5186

WEST BROMWICH.—For alterations and additions to The Poplars, for T. B. Salter, Esq. Messrs. Nichols and Chamberlain, architects:—

Fisher	£449 0 0
Wilkes (accepted)	443 10 0

COMPETITIONS.

ST. GILES'S, CAMBERWELL, Mar. 7.—Wanted plans as to the best means of laying out an estate of about four acres in the Old Kent-road. March 7th.

WOLBOROUGH LOCAL BOARD, NEWTON ABBOT, DEVON, Mar. 7.—Plans for laying out a market. R. H. M. Baker, Clerk.

CONTRACTS OPEN FOR BUILDING ESTIMATES.

BRADFORD, Feb. 28.—For the construction of a service reservoir at Horton Bank Top. W. T. McGowen, Town Clerk, Corporation Office, Bradford.

HUCKNALL TORKARD (Notts), Feb. 28.—Local Government Act, 1858.—For the construction of the several works required for the drainage of certain portions of the district under their control. John Godber, Chairman, Countersigned, C. J. Spencer, Clerk.

STOKE-UPON-TRENT, March 14.—For the construction of about 1800 yards of main streets, and about 1700 yards of back roads, together with the necessary drains, on the Workmen's Land Society's Estate. Charles Lynam, architect, Stoke-upon-Trent.

SUSSEX, March 1.—County Bridge, near Berwick.—For the construction of abutments and flood arches for a bridge over the river Cuckmere, on the turnpike-road leading from Lewes to Eastbourne. W. K. J. Langridge, Clerk of the Peace for the County of Sussex, County Hall, Lewes.

MAIDSTONE LOCAL BOARD, March 1.—For 600 yards of stout 2½in. tooled Yorkshire flags, hard quality, to be delivered alongside wharf, at Maidstone. Edward Hoar, Clerk to the Board, Maidstone.

DANTZIC, March 2.—Sewerage and Sewage Utilization Works.—For the construction and erection on the Kempe at Dantzic, of a pair of double cylinder, condensing, beam pumping engines, to be used for raising the sewage of the town to the land on the shores of the Baltic. Mr. Balwin Latham, C.E., 6, Westminster Chambers, S.W., the engineer of the works.

ROSS, March 6.—For the erection of a villa residence, conservatory, stabling, &c. Messrs. Medland and Son, architects, Clarence-street, Gloucester.

ALTON UNION, March 1.—For the erection of new sick wards, &c., at the Union Workhodse. W. H. Moss, Clerk, Alton, Hants.

S. MARY, ISLINGTON, March 4.—For day and jobbing work in connection with the drains and sewers. J. Layton, Vestry Clerk, Vestry Offices, Upper-street, Islington.

BOARD OF WORKS, POPLAR DISTRICT, March 4.—For masons' work; for the supply of Port Philip and Bombay stone, gravel, flints, and broken Guernsey granite; for repairs to the sewers, galleys, &c.; for scavenging and watering; for the collection of dirt, &c. S. Jeffries Barth, Clerk to the Board, 291, East India Dock-road.

S. JOHN, HAMPSTEAD, March 4.—For the supply of Yorkshire paving, Aberdeen, Haytor, and Shap Fell granite kerb, Markfield, Groby, and Penmaen Main pavings of the best quality. Mr. W. Gribble, Vestry Clerk, New End, Hampstead.

S. JOHN, HAMPSTEAD, March 4.—For the supply of broken Markfield, Groby, Bardon Hill, and Clee Hill granite, Dorking lime, and stock bricks. Mr. W. Gribble, Vestry Clerk, New End, Hampstead.

WHITTINGHAM ASYLUM, COUNTY OF LANCASTER, March 12.—For the erection of certain buildings. F. C. Hulton, Clerk to the Committee of Visitors, Winckley-square, Preston.

WAR OFFICE, PALL MALL, March 12.—For the supply of materials, and for the performance of bricklayers, masons, carpenters, slaters, plasterers, plumbers, smiths, paviors, painters, glaziers, paperhangers, and gas fitters' work at Gravesend, Tilbury Fort, &c. Commanding Officer, Royal Engineer Office, Gravesend.

S. LUKE'S WORKHOUSE, CITY-ROAD.—For the erection of a block of buildings for the reception of 450 paupers. Mr. H. S. Snell, Architect, 36, Chancery-lane, E.C.

S. MARYLEBONE, March 3.—For the supply of stoneware, sewage pipes, bends, junctions, &c. W. E. Greenwell, Vestry Clerk, Court House, S. Marylebone.

S. MARYLEBONE, March 3.—For the supply of Guernsey, Groby, or Whitby chippings, and other materials for the repair of the carriage and footways. W. E. Greenwell, Court House, S. Marylebone.

S. MARYLEBONE, March 3.—For bricklayers, plasterers, slaters, carpenters, painters, and glaziers, plumbers' and smiths' work, and for the supply of horses, carts and drivers, ballast, sand, gravel, &c. W. E. Greenwell, Court House, S. Marylebone.

STALBRIDGE (Dorset), March 8.—For the erection of a new Congregational Church and Schools. W. J. Stent, Architect, Warminster.

CROYDON LOCAL BOARD OF HEALTH, March 15.—For the construction of earthenware and brick sewers. Mr. B. Latham, C.E., 6, Westminster Chambers.

METROPOLITAN BOARD OF WORKS, March 11.—For the construction of brick and pipe sewers in Limehouse. J. Pollard, Board of Works, Spring-gardens.

LAMBETH, March 4.—For the supply of men, horses and carts for watering the roads. T. Roffey, Vestry Hall, Kennington-green.

LAMBETH, March 4.—For the slopping and cleansing work. T. Roffey, Vestry Hall, Kennington-green.

LAMBETH, March 4.—For the supply of broken Guernsey granite, flints, fine and rough gravel, paving materials, &c. T. Roffey, Vestry Hall, Kennington-green.

LAMBETH, March 4.—For the execution of masons' and paviors' work. T. Roffey, Vestry Hall, Kennington-green

BATH STONE OF BEST QUALITY.

RANDELL, SAUNDERS, and COMPANY, LIMITED, Quarrymen and Stone Merchants, Bath. List of Prices at the Quarries and Depôts; also Cost for Transit to any part of the United Kingdom, furnished on application to

BATH STONE OFFICE,
[ADVT.] Corsham, Wilts.

BANKRUPTS.

(ACT 1869.—TO SURRENDER AT BASINGHALL-STREET.)

Mann, Thomas, Penge, builder, March 11, at 12

(ACT 1861.—TO SURRENDER AT BASINGHALL-STREET.)

Downing, Frederick Arundel, Great Russell-street, engineer, March 4, at 1; Hazard, Henry Herbert, Sylvan-grove, Old Kent-road, engineer, March 8, at 11.

(TO SURRENDER IN THE COUNTRY.)

Tinkler, Mary, Stamford, builder, March 1, at 11; Thomas, William, Pendawdd, Llanrludian, Glamorganshire, builder, March 9, at 2.

PUBLIC EXAMINATIONS.—ACT 1869.

March 10, D. Tidey, Belsize-park-gardens, builder—March 18, W. Knight, Horwich, near Bolton, brick and tile manufacturer—March 8, J. Cunliffe, Leigh, brick maker—March 15, W. Anthony, Aberdare, contractor—March 19, F. Southcoates, Everton, joiner—March 16, H. Toy, Birmingham, brassfounder—March 4, G. Heveningham, Wolverhampton, builder.

SITTINGS FOR LAST EXAMINATION.—ACT 1861.

March 18, F. Saunders, Gloucester-road, South Kensington, builder—March 22, T. L. Ryott, Newbury, brickmaker—March 22, H. and E. Strutt, Plaistow, gas fitters—March 22. J. Scott, Richard-street, Islington, gas fitter—March 23, W. Brewster, Margaretta-terrace, Hammersmith, builder—March 22, T. Hoad, Weymouth-street, Portland-place, plumber—March 23, T. Lee, Lordship-place, Chelsea, plumber—March 23, R. Whiteway, Appleford-road, Westbourne Park, house decorator—March 2, H. Lewis, Carmarthen, plumber—June 2, J. Brady, Woolwich, builder—June 2, C. P. Thurgate, Great Yarmouth, builder—June 2, H. Bagge, Hatfield-square, Fulham, builder—June 2, E. Jennings, Hereford-road, Westbourne-grove, builder—May 26, T. S. Manwaring, Lewisham, carpenter—June 2, J. H. Hassam, King's-road, Chelsea, plumber and decorator—June 2, S. Hoel. Burlington Mews, Westbourne Park, carpenter—March 11, J. Moore, Pickering, district road surveyor.

DIVIDEND MEETINGS.

March 3, W. Thompson, Sheffield, builder—March 3, G. F. Forster, A. Keir, and J. Brotherton, Stockton-on-Tees, timber merchants—Feb. 29, R. Napper, Gulhampton, Somersetshire, carpenter—March 2, T. Benson, Acomb, Yorkshire, joiner.

DECLARATIONS OF DIVIDENDS.

T. and W. Clarkson, Everton, painter and plumber, div. 1s. 3d.—C. Pierse, Oxton, near Birkenhead, builder, div. 3½d.

BANKRUPTCY ANNULLED.

Atkins, James, and Atkins, William Cooper, Riddlesdown, near Croydon, and Battersea, lime burners, Feb. 16.

PARTNERSHIPS DISSOLVED.

Longley and Sons, Leeds, builders—Briggs Brothers, Barton-upon-Humber, builders—Matthews and Son, Wednesbury, plumbers and glaziers—Hack and Taylor, Chariton Kings, house decorators—Stubbs and Co., Runcorn, boat builders—M'Arthur and Co., Rood-lane and elsewhere, metal merchants—Flaxman and Co., Walbrook, iron merchants—Wileman and Wigley, Burton-upon-Trent, joiners—Thornton Brothers, Bradley, Yorkshire, slaters.

LATEST PRICES OF MATERIALS USED IN CONSTRUCTION.

TIMBER. Duty 1s. per load; Drawback. 1s.

	£ s.	£ s.
Teak ..... load	11 5	11 15
Quebec, red pine	3 15	4 15
,, yellow pine..	4 0	5 0
St. John, N.B. yellow	0 0	0 0
Quebec oak	5 15	6 5
,, birch	3 15	4 15
,, elm	4 5	5 5
Dantzic oak	4 5	6 5
,, fir	2 5	4 0
Memel fir	2 5	3 10
Riga	2 15	3 2
Swedish	2 2	2 12
Masts, Queb. red pine	3 10	6 0
,, yellow pine ..	4 5	6 0
Lathwood, Dant. fm.	4 0	6 0
,, St P'burg.	6 0	6 5
Deals, pr C., 12ft by 3 by 9 in. duty 2s. per load, drawback 2s.		
Quebec, white spruce	12 0	17 10
St. John, white spruce	12 0	15 0
Yellow pine, per reduced C.		
Canada, 1st quality..	18 10	19 10
2nd do.....	13 0	13 10
Archangel, yellow ..	10 10	12 10
St. Petersburg, yel...	11 10	12 10
Finland	6 5	7 15
Memel	7 0	9 0
Gothenburg, yellow	8 0	9 10
,, white ..	0 0	0 0
Gefle, yellow	9 0	10 10
Soderham	8 0	9 10
Christiania, per C., 12 ft. by 3 by 9 in.		
yellow	10 0	12 10
Flooring Boards, per sq. of 1in., first yel.	7 6	10 6
First white	7 0	9 6
Second qualities	6 0	7 0
PUMICE STONE pr tn	6 0	8 0
OILS, &c.		
Seal, pale .. per tun	43 0	0 0
Sperm body.....	89 0	90 0
Cod.....	38 10	39 0
Whale, Sth Sea, pale	39 0	0 0
Olive, Gallipoli.....	60 0	0 0
Cocoanut, Cochin, tun	45 10	46 0
Palm, fine	32 0	35 0
Linseed.....	31 0	31 10
Rapeseed, Eng. pale..	45 0	0 0
Cottonseed	31 0	37 0

METALS.

LEAD:—

Pig, Foreign	per ton	18	7 6	0	0	0
,, English, W.B.	do.	19	10 0	0	0	0
,, Lead Co.	do.	19	5 0	0	0	0
,, Other brands	do.	18	15 0	19	0	0
Sheet Milled	do.	19	5 0	19	10	0
Shot, Patent	do.	22	0 0	0	0	0
Red or minium	do.	20	10 0	0	0	0
Litharge, WB	do.	0	0 0	0	0	0
White dry	do.	26	0 0	28	0	0
,, ground in oil	do.	26	0 0	29	0	0

COPPER:—

British—cake and ingot	per ton	70	0 0	71	0	0
Best Selected.....	do.	71	10 0	72	10	0
Sheet	do.	76	0 0	78	0	0
Bottoms	do.	79	0 0	80	0	0
Australian	do.	71	0 0	74	10	0
Spanish Cake	cash	0	0 0	0	0	0
Chili Bars	,,	66	0 0	67	0	0
,, refined ingot		69	10 0	71	0	0
Yel. Metal Sheathing & Rods	per lb.	0	0 6½	0	0	6½

THE BUILDING NEWS.

LONDON, FRIDAY, MARCH 4, 1870.

HOW THE PEABODY FUND IS ADMINISTERED.

THE fourth annual report of the trustees of the Peabody Fund, just issued, is a document of great significance, and has a very important bearing not only upon the due administration of that vast fund, but upon the far wider question of the improvement of the dwellings of the working classes in general. It happened that Mr. Peabody began his series of splendid donations just about the time when other philanthropists had, for the most part, begun to flag in their exertions so far as to give up the attempt to provide dwellings for the really poor of London as entirely hopeless. All the improved dwellings erected by the several philanthropic societies of late years have been for the class of well-to-do artisans. The Peabody Trustees are consequently the only public body at present in practical charge of this great question. Hence, a serious responsibility rests upon them. The magnificence of the gift, and the unprecedented generosity of the lamented donor, have attracted an amount of public attention to their proceedings which has been given to no similar effort. The task before them is to show that the decent poor of London can be decently housed without pauperising them—that is, without letting places to them at unremunerative rents. If the trustees accomplish this task, Mr. Peabody's half-million of money will prove a prolific seed of future benefit. The success of the trustees will assuredly bring a host of imitators into the same field—persons who are willing to do good with their capital, but who cannot afford to sacrifice the moderate interest it ought to produce. The fair accumulations of the fund itself will also increase in the ratio of compound interest to an amount which may enable them to extend its benefits to a much wider extent in the future, and to still lower classes of the community. The failure of the trustees, on the other hand, will involve most disastrous consequences. Not only will Mr. Peabody's generous gift have accomplished the minimum amount of good which it is possible to do with half-a-million of money, but a serious discouragement will be given to anybody who might be disposed to go and do likewise.

We are sorry to say that the document before us shows that the trustees have failed to accomplish anything like the amount of usefulness fairly to be expected from so great a fund in the period since the first donation. In the first place, they do not seem to be sufficiently *active*. The necessity for improved dwellings in London is great, urgent, and pressing, and no pains should have been spared to push their work forward with the utmost celerity. Mr. Peabody's first donation of £150,000 was made in March, 1862, exactly eight years ago, and the first report was issued in January, 1866, nearly four years afterwards. The interval had been occupied with dilatory legal proceedings (for which the trustees must, we suppose, be held excused) in preparation of a trust deed. Their first building was opened in Spitalfields, in February, 1864, and their second, in Islington, in September, 1865. They had then purchased land at Lawrence-street, Chelsea, at Bermondsey, and at Shadwell, and at the last-named place they had commenced building. On the whole, we could not complain so far, but it would be reasonable to expect that having once got into regular working order they would have gone on at a more rapid rate. But now, at the beginning of 1870, after another interval of four years, we find only the completion of the buildings already commenced at Shadwell, the erection of one block at Westminster, and the commencement, but no more, of the comparatively small building at Lawrence-street. The land at Bermondsey, purchased at least six years ago, remains unbuilt upon, and the money paid for it lies idle and unproductive. We think, if the trustees desire to stand well in public opinion, they should give an explanation of this last fact. In the absence of explanation it has an extremely disagreeable appearance. They do not state where the site is, whether it is covered with houses or is merely waste land. If waste land, there surely could be no obstacle to its being built upon during the past six years, and if it is land producing a rental of some kind (and it would be difficult to find land in London which does not), the rental for the past six years should appear in the accounts, where we find no trace of it. The land at Lawrence-street, Chelsea, was, in like manner, from five to six years in hand before they commenced building upon it; and, in the absence of information, we are likewise compelled to ask why that was also allowed to remain so long unproductive, if it were so (which is doubtful), and if it produced rental, why does not the amount appear in the accounts? With respect to the second trust of £200,000, it appears not to have been available for building purposes till July last, and the trustees have acquired by its means three extensive sites at Brixton, Cheyne Walk, Chelsea, and the Magdalen Hospital Estate, at Southwark. How long these sites will remain uncovered with new buildings we have yet to learn. One of them, that at Brixton, has been in hand long enough to produce a rental of £240; the others are unproductive.

Taking the whole period covered by the first trust, we find that the trustees, with a command of £150,000 and its accumulations, have only erected four buildings, accommodating 498 families, and commenced a fifth for 68 families. Let us now see, by comparison, what the trustees might have done had they been as active as others, working at the same time, and with means much more limited. The Improved Industrial Dwellings Company was formed in 1863, more than a year after the incorporation of the trustees, so that, making every allowance for legal delays, the two bodies may be taken to have been working for the same period. The Company began with a capital of only £30,000, which has since been raised, as circumstances required, to £250,000. Up to the end of 1869, they had built nine blocks of dwellings for 653 families, at a cost of £127,051. The contrast with the Peabody trustees is very great, and exceedingly unfavourable to the trustees. The funds of the company have been collected with some difficulty. They have spent £32,000 less than the Peabody trustees, and yet have provided dwellings for 155 additional families. To this we must add that the same company has now in hand buildings at Bethnal Green and Pimlico, to accommodate another 220 families. With this example before them, the public are surely entitled to expect much greater results in the future from the Peabody trustees. They hold the land, they have the money at command to build upon it, and it is intolerable that only one pile of buildings should be carried on at a time, and that at a "one-man-and-a-boy" rate, while the applications of the poor who want respectable homes crowd their books without their having the means to supply them.

When we come, however, to consider the question of the economy displayed by the trustees, we are not sure whether their delay is entirely a matter to be deplored. On two former occasions (*vide* BUILDING NEWS, March 8, 1867, and February 21, 1868), we called special attention to the outrageously extravagant amounts that had been spent upon the buildings then erected. The houses at Spitalfields, deducting a large estimated proportion for the shops, had cost as much as £337 per tenement, and £161 per room; at Islington, £273 per tenement, and £135 per room; at Shadwell, £224 per tenement, and £[illegible] per room; and now we find that at Westminster the expenditure has been at a similar extravagant rate—viz., £326 per tenement, and £135 per room. For permitting their architect to allow such enormous sums to be spent on buildings which, though of solid and honest workmanship, are studiously plain in their interior fittings and finishings, and by no means extremely ornamental in the exterior, the trustees must have some difficulty in finding an excuse. When they entered upon the task of building dwellings for the poor there were plenty of precedents to guide them, and it should have been their task to examine all these, and decide upon the most suitable and economical. The buildings of the several London societies are no way inferior in comfort or solid and good workmanship to those of the trustees, and had they been studied, as they should have been, previous to the adoption of the present plans, we might have seen dwellings for quite double the number of inmates with equal, if not greater comfort, and at much less cost. The following table shows the cost of several other buildings of the same class, none of them being in any way inferior to the Peabody buildings, but in many respects even superior. It was the duty of the trustees to have improved upon these models, and not to have retrograded:—

	Date of Erection.	Architect.	Cost including land.	No. of families.	No. of rooms.	Cost per room.
Metropolitan Association for Improving the Dwellings of the Industrious Classes:—			£			£
Pancras Square	1847	Mr. Moffatt	20,556	110	429	49
Albert Street, Mile End	1850	Wm. Beck	11,305	60	234	49
Nelson Square, Bermondsey	1854	C. Lee	25,051	108	408	51
Ingestre Buildings, Eldon Square	1885	Do.	15,852	60	224	70
Society for Improving the Condition of the Labouring Classes:—						
Streatham Street, Bloomsbury	1850	H. Roberts	8,916	54	135	65
Built by H.M. Government:—						
Lodging House, for Married Soldiers, Francis Street, Westminster	1854	H. A. Darbishire	6,690	54	112	60
Miss Burdett Coutts:—						
Columbia-square, Bethnal Green	1862	Do.	43,765	189	410	106
William Gibbs, Esq.:—						
Rochester Buildings, Westminster ..	1862 to 1864	Do.	32,377	108	334	97

The three last buildings were put up by their own architect, and, before committing themselves without competition to the guidance of this gentleman, it would have been well if they had observed that his plans are the most expensive which have yet been executed.* The fund they administer is a most sacred public trust, and should be expended with the utmost caution and

* The cost per room in Ingestre Buildings and Streatham Street is increased very much by the unusually heavy price paid for the land. If this amount (£6000) were subtracted in the former building, the cost per room would appear to be only about £44

economy. It surely cannot be right to spend from £130 to £160 upon rooms which others have built or £50. That this has been done is a great waste of the capital, and a diminution of the future income, for which all future generations of the poor of London must suffer. It would be as far from our wish as it was from Mr. Peabody's intention that the inmates of his houses should pay high rents to make up a large dividend. But he certainly did mean that the fund should be fairly remunerative. His idea was that the hard working honest poor should have greater home comfort for the same amount they were hitherto compelled to pay for little or no comfort, and he wished to afford them this without weakening their sense of honest independence by extending it to them as a charitable dole. All this has been proved to be practicable, and easy of accomplishment when once sufficient capital has been raised to erect the buildings. But it has not been done by the Peabody trustees. The dwellings of the Metropolitan Association, of the Society for Improving the Condition of the Labouring Classes, and of Mr. Gibbs, at Westminster, all afford quite equal comfort to the tenants. They are let at rents barely exceeding the Peabody rents, and yet they pay fair dividends of from 4½ to 6 per cent. Every inmate in them may feel himself an independent man, paying fair money for money's worth; but as the case stands the Peabody tenants are to a certain degree left to feel themselves recipients of a charity. The return from rents is only just about 2 per cent. If the first cost of the buildings had been less, the return might have been double at the same rents; no comfort afforded to the tenants need have been abridged in the slightest degree, and the result would have been a double ratio of increase of the fund for future extensions. In so far as the past expenditure is concerned these things can truly be mourned over, but not remedied. For the future there remains the hope that as the large amounts of the second and third donations, together with the £150,000 left by Mr. Peabody's will, still remain intact, the trustees may adopt a different class of building, or exercise a stricter personal surveillance over the estimates. Our own opinion is that they should take the public a little more into their confidence *before*, and not *after*, they have spent their money. We are sure that had they done so—had they invited plans from all who had experience in the matter, or thrown open their design and execution to the competition of the building professions, they would never have been guilty of the folly of erecting dwellings for the poor of London at a cost of £130 to £160 per room.

A FEW FACTS ABOUT DRAINAGE.

A RECENT report of the Sanitary Inspector of the town of Leek shows that it is nineteen years since he began to keep a record of the various details bearing upon the general economy of life in the town, at the instance of the Registrar General, and upon the prescribed form used in the statistical department of his office; and this record, kept in accordance with suggestions from time to time made to him, Mr. Farrow, by the chief officers of the Registrar-General's Department, Dr. Farr and Captain Clode, has been of the greatest assistance and importance to the Improvement Commissioners of the town in promoting the physical and social welfare of the inhabitants. During the first few years of this period the subjects of drainage and water supply were from time to time talked of, and ultimately it was resolved to drain the town, and establish a regular staff of sanitary officers. The sewerage works were commenced in 1858 and finished in 1860, so that this record enables a comparison to be made between the ten years previous to the establishment of drainage works and the nine years since they have been in operation, a length of time on each side of the critical year which may reasonably be supposed to show a general result, and whether the outlay of money made in 1858, 1859, and 1860, and the continued maintenance of the sanitary staff, have been justified.

Leek is not a large town, but may be considered to be nearly of an average size, the population being now between ten and eleven thousand, and it has increased during the nineteen years in the proportion of 9 to 11. During the ten years ending 1860 the total number of deaths was 2819, being an average annual rate of 29 in every thousand of those living, and the average age of those who died during that period was 24·8 years. During the nine years ending 1869 the total number of deaths was 2242, being an average annual rate of 24 in every thousand of the living, and the average age of those who died during this period was 32·5 years.

According to the data given by Dr. Farr in the census returns for the year 1868, 293,280 weeks' sickness were due to the population of Leek during the ten years ending 1860, and 233,792 weeks during the nine years ending 1869, which, corrected for the increase of population, shows the total amount of sickness to be 50,755 weeks less during the latter period than would have occurred during the same time if the sanitary state of the town had continued the same as it had been during the previous ten years. The total number of deaths during the nine years ending 1869 was 492 less than would have occurred in that time if the mortality had continued unabated, and the 2242 persons who died during the nine years ending 1869 lived 16,309 years longer than they would have lived if they had died at the same rate as those did in the previous years, which is equivalent to an average increase of 7·7 years in the duration of each person's life.

Supposing the average cost of each person's sickness to be five shillings per week (which is a low estimate), it would follow that during the last nine years £12,688 has been saved to them. Of the 50,755 weeks' sickness prevented, 16,917 is the number due to persons between the ages of 15 and 55 years, and these are the persons who may be taken to be producers. Assuming a male person's earnings to be ten shillings per week and a female's five shillings, this represents a saving of £6343. In addition to this, there were 492 deaths prevented. Supposing the funeral expenses consequent on each death to be £5, there has been a charge upon the community on this account of £2460 less than would have been the case if the former state of things had continued to exist, making altogether during the last nine years a saving of more than £21,000, besides the great increase effected in the value of life, and the moral and social improvements which always attend such increased values.

There can surely be nothing more certain than that the welfare of the poor is intimately connected with that of the comparatively rich, and at Leek we have the means of separating the conditions of life of the two classes, for there is a burial society which consists of nearly all the poorer people, including their children above the age of three months, and which comprehends one-half of the population. The society is not an insurance society, and requires no accumulated funds, but simply makes equal calls of one penny per member as required. During the nine years ending 1860 the number of members of this society was, on the average of those years, 4909, and the total number of deaths 1199, the average age at death being 20·4 years, and the total cost of funerals £4539, being 18s. 5¾d. per member; whereas during the nine years ending 1869, the average number of members was 6142, the total number of deaths 971, the average age at death 26·3 years, and the total cost of funerals £3884, being at the rate of only 12s. 7¾d. per member. Corrected for the increased number of members during the second period, it will be seen that the total number of deaths during this time would have been, according to the old state of things, 1497, instead of the actual number, 971; and the total cost of funerals £5676, instead of £3884. The total cost of the sewerage works did not exceed 15s. per head of the population, so that their cost would seem to have been paid off within three years of their construction.

These being the facts of the case, let us see what are the conditions under which they have obtained. It is generally understood that the quality of the water supply of a town, and the manner in which the sewage is conveyed away from the habitations of men, are the two chief agencies of health or of disease. As to the water supply of Leek, there are no wells in the town—wells which are the fruitful sources of much disease in other towns. The town has been supplied with water for a great number of years from the hills several miles off, the water from which is originally very pure, but, until recently, was much contaminated in its passage to the town, and very deficient in quantity. Those persons who were not supplied with water from this source took it from the river which runs by the town, and which has its source in the same range of hills. The general character of this water is unquestionably good, as, indeed, most waters derived from hill sources are. The Leek Improvement Commissioners, however, have not rested satisfied with this, but have secured for the town the very best part of this water, viz., the copious springs issuing from sandstone rocks. To bring a supply of water into a town, however, and make no provision for carrying it away from dwellings after it has been used, is almost to do nothing to improve the sanitary state of a town. The greater part of the ground under the feet of the people of Leek is of an absorbent nature, and previous to the proper drainage of the town the liquid sewage had been absorbed into it for so long a time that it had become, as it were, sodden with it, and for many years before the town was drained, of which we have but trustworthy records of ten, this sewage-sodden ground had rendered the town very unhealthy. If the ground had been of a less absorbent nature, the necessities of drainage would probably have forced themselves on the attention of the inhabitants as a matter of convenience long before they did as a matter of health.

The particular manner in which Leek was drained, in respect of the construction of the sewers, can hardly be a matter of public interest, but one or two points may be mentioned which may be so. One of the chief features of the work is that both sewers and house drains were freely ventilated, about 200 pipes being carried up the walls of houses in various parts of the town, so as to carry up the sewage gases above the roofs of the houses. Care was taken that none of these pipes should terminate near to bedroom windows. The upper ends of the house drains were preferred as the best points at which to make the connections between the drains and the ventilating pipes, those places being the places at which the light sewage gases, sulphuretted hydrogen and carburretted hydrogen, have a natural tendency to accumulate, and it was thought that if a rigid system of trapping all openings at the ground level were adopted without providing some proper means of escape for the foul air of the drains when it should be displaced by the flow of water down the drains, it would be driven into the houses, and so these connections were made to afford it an outlet above the roofs of the houses, where it was believed it would be harmless—would become destroyed or chemically changed, or at least would become so much diluted as to be harmless. The Medical Officer of Health and the Sanitary Inspector are quite of opinion, after experience,

that this ventilation of the drains has contributed much to the beneficial results that have undoubtedly followed the drainage of the town.

It may be said—Mr. Rawlinson has said it—that to reduce the rate of mortality in a town to no less than 24 in the thousand is nothing to boast of; and that remark would seem to be very applicable to towns in general, but there are peculiarities of the trade of Leek that make it highly probable that it is impossible to reduce it much below that rate. Large numbers of the population are employed in silk factories, and there are sufficient reasons why this employment has a tendency to deteriorate their health.

The only other point, perhaps, that need be mentioned as of interest, is that the sewage is utilised in irrigating about 100 acres of grass land close to the town. Many persons object to this mode of sewage utilisation, because they think it must be unhealthy to live near land so irrigated. That has not been found to be the case at Leek. There the land lies chiefly on the side of the town that is said to be the most objectionable—viz., the south and south-west. The whole population reside within half a mile of some portion or other of this irrigated land, and a thousand of them within 100 yards of it, and in no case has it been observed that the proximity of this land has had any injurious effect on the health of the persons residing nearest to it. There is a peculiarity in the case which is a proof of this. In their desire to avoid litigation, the Town Commissioners gratuitously gave to the landowners the use of the sewage, with the provision that in case it should ever thereafter prove to be a nuisance the Commissioners were to resume possession of it. This they would now gladly do, in order to be able to demand payment for it, and their officers are always watching for an opportunity to establish a charge of nuisance on this irrigation, but hitherto have been unable to do so.

On the whole, Mr. Farrow's report must be considered to be a signal proof of the advantages of proper sanitary works and regulations in a town, and also of the importance of keeping an accurate record of passing events, which enables future legislation to be based on truth instead of guess-work.

CONCRETE BUILDING AT TWICKENHAM.

A ROW of five dwelling houses, with shops, is now in course of erection close to the Railway Station, Twickenham, upon the estate of C. P. Swanton, Esq., by Messrs. Hooper and Corpe, of Park Prospect, Westminster. They are of three stories in height and the walls are constructed entirely of concrete, composed of gravel dug upon the spot, with Thames ballast from the neighbourhood, and Portland cement. What is particularly noticeable, however, is a very great simplification and improvement in the ordinary concrete building apparatus, invented by Mr Hooper, and used experimentally for the first time in these buildings. In this improved apparatus the upright iron angle pieces, which form a prominent feature in the ordinary apparatus, are altogether dispensed with, their place being supplied by boards carefully adjusted to the proper angles, and which themselves form panels of the framing. Another improvement is that the panels are joined to the uprights by a simple hook and eye arrangement, whereby all bolts and nuts are entirely dispensed with, and the shiftings of the apparatus are performed in a fraction of the time commonly required. In the next place the cores used to connect the opposite sides of the framing are simple pieces of flat iron, which, when withdrawn, leave no perceptible hole in the wall. The round cores commonly used leave, of course, a hole of their own shape and size, the imperfect filling up of which often permits of an entry for vermin. These flat cores are fixed in their proper places without nuts and screws by the simple means of a pin dropping into a slot. In addition to these advantages, the framing has been constructed of the depth of two feet, instead of the ordinary depth of eighteen inches, and the walls have been successfully carried up at the former rate per day. They are now raised to their full height, the roof is being fixed, and the result, which is eminently satisfactory, may be inspected by any person interested in the subject. Messrs. Hooper and Corpe are so well satisfied with this first experiment with their improved apparatus, which has effected a great economy both of time and labour, that they intend to continue its use in all their future concrete buildings, and those who desire to see it in practical use will shortly have an opportunity of viewing it in the construction of several pairs of concrete villas upon the same estate, the first of which is already laid out, and will be immediately commenced.

ON ORNAMENTAL IRON WORK.

ON Monday last Mr. J. M. Capes, M.A., of Balliol College, Oxford, delivered his fourth lecture on ornamental ironwork, to a large audience in the Lecture Theatre of the South Kensington Museum. On the table were a number of choice specimens of ornamental fire-screens, gratings, &c., some being several centuries old. Referring to these, Mr. Capes said that he very much doubted whether any workers in iron at the present day could produce specimens of their skill at once so beautiful in design and so perfect in execution. He did not deny that in these specimens there were many faults, but they were so far above the average run of modern productions that they might almost be said to approach perfection. He knew that there were many workers in iron who could turn out a good copy of perhaps any piece of work, but such was not the way the specimens exhibited before them had been produced. From a slight sketch furnished to the producer of any one of these specimens, he had supplied the ornamentation by drawing upon the resources of his own artistic feeling, and of his own skilled hand. The production of ornamental ironwork in the present day was impossible unless the worker himself was something more than a mere copyist. He must be an artist, and be able to appreciate and to execute what is beautiful. It was a misnomer to call his occupation a trade. Trade meant something entirely different. Ironwork was, in the truest sense of the word, an art. Referring to the collection of ornamental iron-work in the Museum, Mr. Capes observed that it represented but a few of the specimens that had been left uninjured by the wars occurring in Europe during the last 500 years. Still they bore sufficient testimony to the existence of artistic workers in iron in the middle ages, such as might be sought for now in vain. The idea in the minds of most people in regard to modern English and foreign work was that in the former case everything was sacrificed to durability and strength, and in the latter to exterior show. To a certain extent this might be true, but whether it was so now or not, such a contrast certainly did not exist in former days, for then our countrymen were artists as well as workmen. In illustration of what he said he pointed to some specimens of English ironwork replete with the tasteful ornamentation he extolled, and then proceeded to refer to the various uses to which light ironwork might be adapted. Premising that the employment of open iron-work was all but illimitable, Mr. Capes, in strong terms, condemned the present mode of protecting the stained glass windows of churches with wire network, which disfigured not merely the windows protected, but the churches also. Why should not there be delicate networks of light wrought-iron, ample enough to protect the windows from the missiles of the malicious, but yet so fragile as not to prevent the light from streaming into the buildings? There would, it is true, be an increase of cost, but we could not expect beauty without paying for it, and after all, when hundreds of pounds had to be paid for a window, it was surely worth while to pay a little more to prevent the outer guard from being a disfigurement to the whole church itself. Light ornamental ironwork might also be used with advantage in pianos, in place of the carved wood-work in front of most of them, and also as a protection to those windows on a level, or nearly so, with much frequented thoroughfares. Again, similar work might be used in lieu of the present cases of organs, which were generally very ugly. The great obstacle to the use of light wrought iron was its old enemy—cheap iron casting, which had kept people ignorant of what the skilled workman could do with the former. Mr. Capes then strongly urged his hearers to practice ornamental ironwork by taking as models such specimens in the Museum as might strike their fancy. They ought not to aim too high at first, but be content, as when learning a musical instrument, to practise the "scales" of their art. By doing this they would add to their handiness and skill. The lecturer next dwelt upon the importance of learning to draw, and for this purpose he said the Art School in the Museum and the schools throughout the country afforded ample facilities. Students should not strive so much to draw landscapes or things of that kind as to make straight lines, curves, &c., to which they were likely at any time in the course of trade to have to apply their skill. From that they might pass on to acquire some facility in handling the paint brush. By this means they would both train their eyes and hands, and they would be enabled, when called upon, to give a sketch of a work in their craft, gracefully and correctly drawn upon paper. As his hearers were aware, persons often required a particular work executed of which they had a vague notion floating through their heads, and in such cases it would be most advantageous to the workman if he could produce it upon paper, without running the risk of executing the work and finding it unsatisfactory to the intending purchaser. In such cases it was not necessary that the drawing should be highly finished, but though it might be bold and rough, it might also be true and capable of conveying an idea of what the work would be when done. Looking at the matter in every way, he could not but think that a knowledge of drawing would add materially to the skill and cleverness of those who possessed it. In all heavy work, the fingers were sure to lose their sensitiveness, unless something was done to retain it, and in no way could this be done better than by practice in drawing. Unless the art workman took care to keep his fingers in order, he might be said to be spoiling his tools, for just as certain ordinary tools required sharpening and grinding, so also the fingers required to be exercised on delicate objects, in order to preserve their sensitiveness. In conclusion, Mr. Capes said that if his hearers took his advice in respect to drawing, they would be thankful for having acquired that art to that end of their lives.

Mr. Capes delivers his fifth lecture next Monday.

THE DOUGLAS (ISLE OF MAN) COMPETITION.

WE are glad to see that Mr. Ellison's praiseworthy opposition to the course adopted by the Manx authorities in the matter of the late Isle of Man House of Assembly Competition has been successful. For more than a year the matter has been in a state of uncertainty. The publication by Mr. Ellison of his plan side by side with that of the architect to whom, in defiance of the conditions of the competition, the premium had been awarded, at once enlisted the public feeling of the island in his favour, and this sympathy was thoroughly endorsed by us and the opinion of several professional men of high standing. Last week the matter was once more brought before the Tynwald Court, and the decision of the committee rejected by 17 votes to 4, all the plans being rejected, and the committee being directed to report to the Court what amount should be paid to Mr. Burnett, the architect to whom the award of the first premium has been recommended, for his modified plans and other expenses, and—what may possibly turn out a more serious matter than the Court apparently expect—how far it stands pledged to the other architects who had competed. The Manx people are to be congratulated on their escape from the adoption of a plan which appeared the least likely to answer its purpose, and was certainly by far the most expensive; the competing architects suffer, but we think even they will rejoice at the reversal of a foolish decision which may clear the way, for some sensible course of action.

It is said that there are at the present time three thousand houses to let in and around Battersea.

Civil Engineering.

EFFECT OF SUDDEN LOADS ON CAST IRON.

BRITTLE substances are usually defined by physicists as those in which the force of cohesion is comparatively weak. Their particles or component atoms are therefore held somewhat loosely together, and when exposed to strains of certain descriptions possess little or no resistance. It will probably here be observed that many brittle substances are endowed with very considerable powers of resistance to a crushing force, although they display but very feeble tensile strength. This is no doubt true. Cast iron, for instance, will stand a direct crushing force of fifty tons to the square inch, while its tensile strength is only eight tons to the square inch. But the real strength of the material is only to be depended upon when the crushing force is applied in a particular manner. It is not so much a question of the amount of the force, as of the manner in which its action is exerted. When it is stated that cast iron will bear a crushing or compressive strain of fifty tons per square inch, it is always presumed that the strain is applied to the material in a similar mode to that which prevailed at the experiments which fixed that constant. Whenever the weight of fifty tons, or other crushing weight, is imposed upon a square inch of cast iron, it is supposed to be by gradual and almost imperceptible increments, commencing with a very small weight, and terminating with that which ultimately determines the fracture of the specimen under experiment. If, on the contrary, the weight be applied suddenly and violently, the material will yield to one very much less in amount. It is this liability to give way under a sudden strain that has rendered engineers so very cautious in employing the material in any situation where it might perhaps inadvertently be exposed to its influence. By an excess of caution, cast iron is frequently, from the same cause, debarred from being applied to numerous useful purposes to which it is perfectly well suited, and in which it might be adopted without the slightest fear of disastrous or unforeseen consequences. It is, no doubt, advisable, especially for young members of the profession to be "on the safe side," as it is termed, but nevertheless, while adhering to the example of precedence, and the result of experience, one must not be afraid to employ a constructive material simply because its employment has been in some instances attended by failure; however, it should not be forgotten that the majority of these failures occurred in the early days of railways, and were due more to the incompetency and rash judgment of the designers of the structures than to any real defect in the material.

At present it may be safely presumed that our knowledge of the nature, properties, and capabilities of cast iron under strain is more complete than it previously was, and it might therefore be concluded that bridges and other structures of that material were not likely in future to be subject to such contingencies. No doubt such accidents are rare, but that they still happen is demonstrated most absolutely by the occurrence that took place recently at the bridge of Elkantara, in Algeria. A description of this bridge will be *apropos* to our present article, and very instructive to those who may have the designing of works of the same or similar character. In the first place let us briefly relate the accident. A roller of five tons in weight was traversing the bridge backwards and forwards for the purpose of crushing the metalling and bringing it to a smooth surface. On a sudden the roadway gave way. The horses attached to the roller were able to maintain it for a few minutes in a suspended condition, while the driver cut the traces, when it disappeared into the gulf beneath with equal noise and rapidity. The ravine across which the bridge of Elkantara is thrown, is nearly 400ft. in depth, so that both driver and horses had a very near escape of being dashed to pieces. The span of the bridge, which is wholly of cast iron, is 184ft. and the clear width between parapets 33ft. There is not the slightest difficulty in the present instance in arriving at the cause of the accident. It was the breaking of one of the cast iron plates constituting the roadway, under the heavy rolling load brought upon it. There are altogether five arched ribs composing the framework or main girders of the bridge, two of which are the face or outside ribs, and the others the interior or intermediate ones. These latter are spaced about 9ft. 9in. apart, and the whole are braced together by cross girders and trussing, also of cast iron. The transverse girders are of a plain T section. Upon the intermediate arched ribs are placed the cast-iron road plates, their span being nearly equal to the distance between the centres of those ribs, which is evidently a long span for cast-iron plates in the situation under description. The plates are slightly cambered, and their average thickness is 0·8in. That of the metalling is about 10½in. The framework of the structure was not in any degree affected by the accident.

A glance at the construction of the bridge at once points out that the contingency was, in the main, due to an attempt at false economy. The design clearly was to dispense with the usual transverse road beams, and make the cast-iron plates do the double duty of acting as road plates and girders at one and the same time. The shape and section of material that will answer perfectly for a road plate pure and simple, where the span does not exceed 3ft. or 4ft., is not by any means adapted to situations where the span becomes nearly 10ft. It is somewhat extraordinary that the French engineers, who, as a rule, calculate the action and effects of strains upon bridges a great deal more precisely than we do, should not have appreciated the exact nature of the case. At the very first sight, a road plate of cast iron nearly 10ft. in span is a very unusual piece of construction, and it could not fail to strike one that in that position it would be acted upon by other strains than that of compression. Cast iron in the shape of a road plate is not adapted to undergo tensile or transverse strain, and even in the best form, namely that of Mr. Hodgkinson's girder, it is not altogether reliable under a heavy impactive or concussive load. In addition to these theoretical objections, there are also others of a practical nature. When the ratio of the thickness of the plates to their superficial dimensions is considered, it is not an easy task to ensure that the casting should be thoroughly, uniformly, and homogeneously manufactured. Any flaw in it, which might, under less trying circumstances, be of no importance, would be fatal to a plate in the situation it was placed in at the bridge of Elkantara. On the score of weight, both cast iron plates, and the still older practice of using brick arches, to carry the roadway are objectionable. They are now nearly obsolete with us. Wrought iron corrugated or buckled plates are the means usually employed by English engineers for supporting the roadway of public bridges, but even in that case their span does not attain to the dimensions of the cast iron plates which have been just described. The cross girders of a bridge require depth, the road plates, superficies, and it is impossible to combine the two in one without the chance of danger, or incurring an unwarrantable expense.

GOSSIP FROM GLASGOW.

(From Our Own Correspondent.)

GLASGOW has long boasted that she is "the second city in the empire." If the contemplated municipal extension had been permitted by an Imperial Parliament, and if the amount of average be accepted as the criterion of precedence, it is just possible that she might shortly have been "the first." However, as Burns says, "the best laid-schemes o' mice an' men gang aft agley," and Glasgow must be meanwhile contented within her old circumvallation. But—again to quote our national bard—"its comin' yet for a' that," for sooner or later, Glasgow, like Saturn, must swallow her own children. Or, giving the illustration another turn in the kaleidoscope, the districts sought to be included in the municipal extension are either the begotten or the foster children of Glasgow, which, enjoying all the advantages of the relationship, would be free from the obligations. This anomalous state of matters of course cannot continue, and the pretty suburbs and petty burghs must one day, with what grace they may, yield to the inevitable.

If it is mortifying to me to write that Glasgow is still the second city in the empire, it is with no less pride that I quote from the play-bills that the stage of the Glasgow Theatre Royal is "now the greatest working stage in Britain." Let us be thankful that we have something "greatest," be it even the talent of trumpeting.

Since I last wrote, the profession has sustained a more than common loss by the death of James Henderson. I was not intimately acquainted with Mr. Henderson, but I well know his works; and I have now to say of them what I wish I had said earlier. Mr. Henderson neither occupied a prominent position in the profession nor enjoyed an extensive practice, and this partly because of his modest and unobtrusive nature. Hence his works are comparatively few, but they are all characterised by many and even peculiar excellences. His favourite style was the Italian, and for this, "staled by custom," he found new features and gave new details. And while his works show much originality, this originality is always subject to judgment, and over all there is a mellow refinement, as, over the day completed, there is a softer radiance in the setting sun. I believe that no architect in Glasgow better understood Italian architecture than did Mr. Henderson, if, indeed, so well; and it is to be regretted that an artist of such great abilities did not make more opportunities for their exercise:—

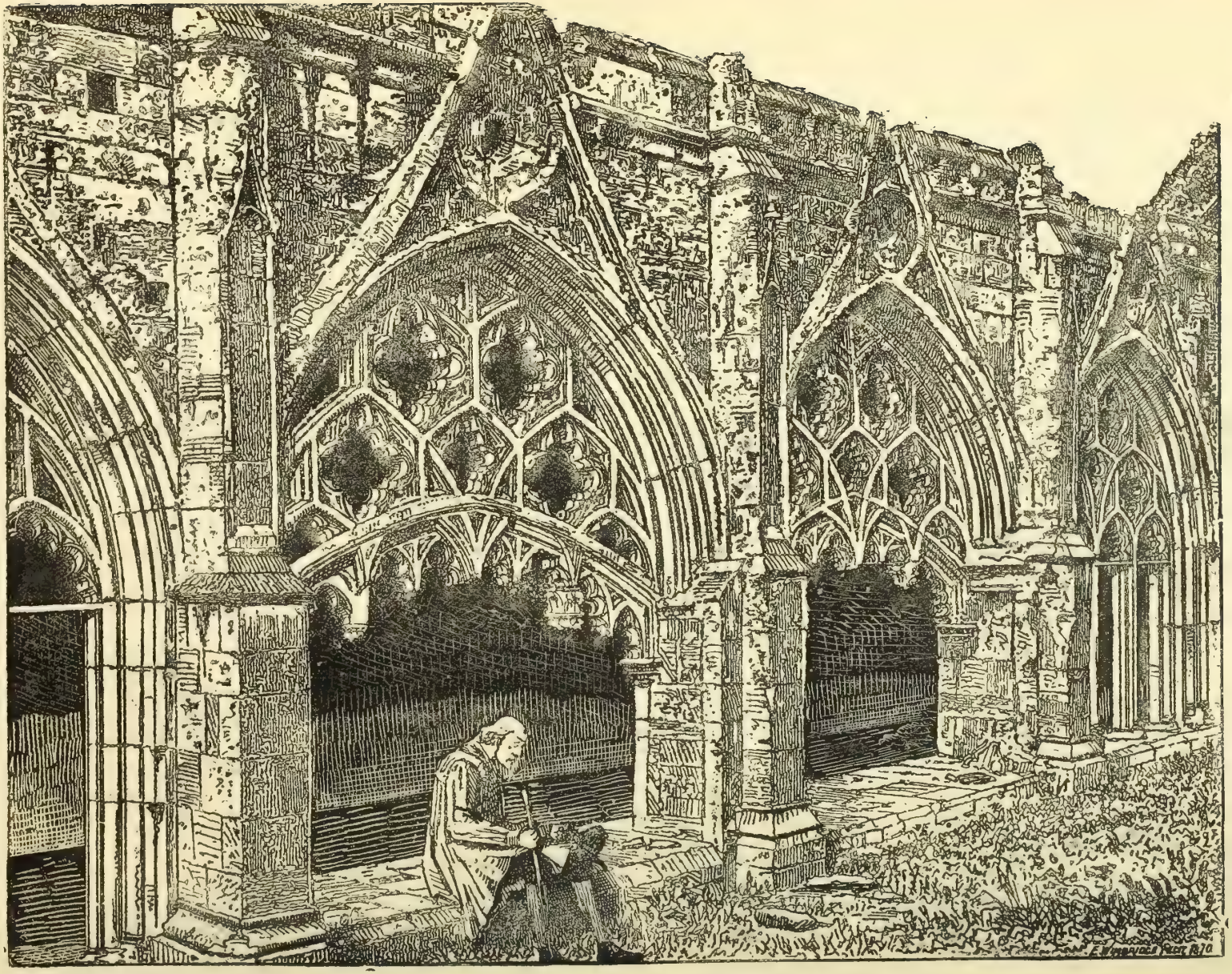
Men's evil manners live in brass; their virtues
We write in water.

Leaving the practice of copper-plate to those whose business it is, our Water Committee are somewhat tardily about to give a lesson in aquagraphy. A fountain is thought to be an appropriate public memorial of the late Lord Provost Stewart, in whose civic reign the Loch Katrine water supply was brought into Glasgow, and accordingly it has been resolved that such a memorial be erected in the garden of Kelvin Grove Park; that designs, with probable cost, be advertised for; and that a premium not exceeding £50 be given for the design that may be accepted. Glasgow architects and others have been recently interested in another fountain—one to be erected in Alexandria (Dumbartonshire) in honour of Mr. Smollett, the Lord of the Manor, a collateral relative of the novelist. Designs were advertised for, and the successful competitors are Messrs. Adamson and MacLeod, of Glasgow.

As the Wallace Monument has been almost wholly a West of Scotland crotchet, its claim to be called "National" has been thought by some to be presumptuous. This claim will, however, soon, be incontestably established, for the monument is, characteristically enough, about to be converted into a publichouse. 'Tis thus that Scotland delights to honour the memory of her great and good! Burns's birthplace is a common alehouse, just because it is his birthplace. An excursionsists' inn flourishes by his Classic cenotaph on the "banks an' braes o' bonny Doon;" and no less a one than Burns himself having said that "Whiskey and freedom gang thegither," there seems to be something singularly appropriate in the licensing as a publichouse of a monument to the great Scottish patriot. In Glasgow we have the association of ideas no more than suggested—but we all know the value of "suggestiveness" in art—in John Knox upon a Doric column of the proportions of a beer barrel. In the neighbouring town of Dumbarton they are associating drinking with education, the classroom of the Grammar Schoo being a drinking booth for the assembly-room, but this, too, is "national," for has not Burns himself said of "guid Scots' drink," that—

It waukens wit, it kindles lear,
An' pangs us fu' o' knowledge.

LIBRARY CATHEDRAL



ENGRAVED BY WIMBRIDGE'S PROCESS.

CLOISTERS—CANTERBURY CATHEDRAL.

I will probably recur to this Dumbarton Grammar School and Assembly-room, as "thereby hangs a tale" of considerable interest to the architectural profession.

Dr. Zerffi has been lecturing to the Haldane Academy with considerable acceptance. His subjects were "Prehistoric Art," "Eastern Art," and "Classical Art," and his treatment of all was alike given and received with much hearty enthusiasm.

I went on a recent Sabbath evening to hear a lecture on "Michael Angelo," by a minister of ths Kirk of Scotland. The subject was not "improved," and the lecture was little more than a dry narrative of the life of the great sculptor. The subject of lecture of the preceding Sabbath was "John Knox," and Knox so closely followed by Buonarotti indicates that art, like ivy, is getting round the Scottish Kirk.

A Masonic hall of a handsome character has been spoken of. Such hall accommodation is much needed in Glasgow, for the City Hall is too large for ordinary purposes, the Queen's Rooms are too far west, and the central and elegant Merchants' Hall is about to be converted into a Hall of Justice for the convenience of the sheriffs. This project may, however, be somewhat chilled by a larger proposal to build a suite of halls, of various sizes, on one of the most eligible sites in the city—central, and with an extensive frontage to several streets, two of them thoroughfares.

As the earth will one day fall into the sun, so has the Architectural Society fallen into the Philosophical. The ultimate fate of either it would be rash to conjecture. At one time the Architectural could support itself without the aid of either a crutch or a guardian angel. Excellent essays were then regularly read, and these were generally followed by animated discussions. The annual general meeting was then something to be alike looked forward to and back upon. Invitations were issued to the presidents of the several learned societies, to artists, and others interested in art, and addresses were delivered by not only professional men, but also by those valuable outsiders who show up architecture from other, and often from original, points of view. The walls of the halls and rooms were covered with drawings of the chief architectural labours of the year, with illustrations of ancient and modern art, and with curtains, carpets, paper hangings, painted panels, and other means and appliances towards domestic comfort and elegance; while on the floor were sculptures, models, building materials, furniture, and long rows of stands laid over with books and kindred illustrations of all appertaining to a house, the whole forming an instructive and most interesting little "Exhibition." And next day this "Exhibition" was thrown open to the public wholly free of charge. The tables at the annual general meeting have more recently been covered, but with "plates" from neither the burin of Piranesi nor the graver of Jewitt, and designed for solely the one art of "carving." Some of the ancients thought that the seat of the intellect was the stomach. The Architectural Society, although somewhat slowly, may have come to a similar conclusion, and it would be blameworthy indeed did it not act upon its convictions. How it will flourish under its new local habitation, if not name, time, and, perchance, your correspondent, will show.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

AT a special general meeting of members only, held on Monday, the 21st of February, 1870, Mr. H. Currey, Fellow, in the chair, the notice convening the meeting having been read, the various subjects proposed for consideration were brought forward in turn, viz. :—

THE ROYAL ACADEMY EXHIBITION.

The correspondence which had passed between the Council and Mr. Sydney Smirke, R.A., on the subject of the accommodation provided for architectural drawings at the Royal Academy Exhibition, having been produced, Mr. J. P. Seddon, Hon. Sec., explained that at the close of last session the Council had received a memorial signed by five Fellows of the Institute, calling attention to the fact that the gallery originally intended to be devoted to Architecture had been otherwise appropriated at the last Exhibition of the Royal Academy. A committee had been appointed to consider this memorial, and, acting on their report, the Council had directed a letter on the subject to be addressed to Mr. Smirke, R.A., whose reply (dated 21st December, 1869) had been already printed in the Institute Notice Paper (No. 6 of this session), and circulated among the members.

Another letter, dated 21st February, 1870, was then read from Mr. Smirke, expressing his regret at being prevented by illness from attending the special meeting, and stating that the south eastern gallery at the Royal Academy (41ft. by 31ft.) was set apart for the exhibition of architectural drawings, and in the event of spare wall space being left, for such water colour drawings as would not interfere with the effect of the other works exhibited in the same gallery.

After some discussion it was resolved "That the Council be instructed to acknowledge the courteous letter received from Mr. Smirke, and to request him to bring under the notice of the Royal Academy the importance of leaving to its architectural members the selection of drawings sent to the Royal Academy for exhibition, which course, if adopted, would, in the opinion of this meeting, meet the wishes of the architectural profession generally."

It was further resolved "That this Institute invite its members to do their utmost to promote a good Architectural Exhibition at the Royal Academy this year."

TERM OF OFFICE FOR HON. SECRETARIES.

Before the discussion on this subject commenced, J. P. Seddon, stated that, in order to facilitate its free consideration by the meeting, he desired to make known his intention of retiring from the office of Hon. Secretary for Home Duties.

After some discussion, it was moved and seconded "That it is expedient that no honorary secretary shall remain in office for a period exceeding five years." But the motion, having been put to the vote in due form, was lost.

Mr. Seddon, however, still expressed his intention of resigning the hon. secretaryship.

PROFESSIONAL PRACTICE.

Attention having been called to a Parliamentary Report on Hungerford Bridge and the Wellington-street Viaduct, containing an appendix headed "Papers handed in by H. Cole, C.B., 3rd May, 1869," it was resolved "That the consideration of this subject be referred to a committee consisting of the vice-presidents and honorary secretary, with power to add to their number."

THE LATE W. BURN, F.R.I.B.A.

The Chairman announced that the Council had with much regret received intelligence of the death of Mr. William Burn, one of the original members of the Institute.

Professor Donaldson having alluded to the deceased gentleman in terms of great respect, it was unanimously resolved "That a letter of condolence be addressed to Mrs. Burn, on the occasion of her recent bereavement."

ARCHITECTURAL ART CLASSES.

The following recommendation of the council, passed by resolution on the 21st inst. was reported: "That a donation of £50 be contributed, out of the funds of the Institute, towards the establishment (and first year's expenses) of the Architectural Art Classes, now in course of formation under a general committee of management." The business of the special general meeting then terminated.

At the ordinary general meeting on Monday evening last,

Mr. SEDDON announced that, at the request of the Council, he had withdrawn his resignation of the office of Hon. Sec. for Home Duties (which he announced at a special general meeting of members on the 21st ult.) He would consent to serve for the remainder of the present session, and would allow his name to be put in nomination for next year.

Professor DONALDSON stated that a letter had been received from the hon. sec. of the S. Louis Institute of Architects, inviting the Royal Institute to interchange correspondence with that body, and asking for certain information, which the Professor had supplied.

Mr. SEDDON directed attention to some specimens of American marbles from quarries situate on the shores of Lake Champagne, Vermont, which were exhibited. The quarries were opened in 1868-69. The State Geologist of Vermont says, respecting these quarries, "The beds dip to the east at an angle of from 10 to 15 deg., and run north and south, and contain a great variety of marbles. The average thickness of the beds is more than 100ft. I never saw larger deposits of marble."

Mr. MASON, a representative of the quarry owners, was present, and in answer to various inquiries, he said that, so far as the marbles had yet been tested, they received a polish easily. They were sold in New York at the present time, in the square block, at an average of about 20s. per cubic foot. American architects were of opinion that these marbles were much harder than Italian marbles. But the great beauty of the marble was the large size of the blocks that could be obtained. The strata were about 6ft. thick, so that columns 6ft. diameter could be obtained of any length.

Professor KERR thought that the marbles in question were more fit for ornamental than structural purposes, *i.e.*, for chimney-pieces, linings, &c., and taking into account their beauty and cheapness, he thought there was a wide field for their introduction in a decorative sense. The Professor said it was an interesting thing to notice, in this connection, that marble pavements are being brought down to such a low price as to enable them to compete with tiles. He was told that a very good marble pavement could now be made for two shillings per foot super, exclusive of laying.

Professor DONALDSON then read two papers, as follows :—

"A Notice of the Inscriptions (commonly called the Testamentum Augusti) in the Temple of Augustus and Rome, at Ancyra."

"On Autograph Drawings of the Great Masters of Architecture, preserved in the Libraries, &c., of Italy and other countries."

We hope to give abstracts of these papers next week. A discussion followed, in which Messrs. Wyatt Papworth, Talbot Bury, J. P. Seddon, and R. P. Spiers, Sir M. Digby Wyatt, and Professor Kerr took part. Professor Donaldson having replied and acknowledged the customary vote of thanks, the meeting adjourned.

THE NEW BUILDINGS FOR THE POST OFFICE.

THE works of the new buildings to supplement the existing General Post Office are making great progress. The excavations are nearly completed, and the vaults under the basement have been commenced. The building will consist of four floors, exclusive of basement. The basement floor will be kept for store-rooms and other purposes, and in the centre will be a large room, 80ft. by 60ft., which will be devoted entirely to the telegraphic department as a battery room. On the ground floor there will be a large public office, 79ft. by 52ft., which will be devoted to business connected with money orders, registered letters, post-office savings banks, and the receipt of telegraphic messages. The principal entrance will be in the centre of the S. Martin's-le-Grand façade, immediately opposite the portico of the existing building. There will be a private entrance for the Post Master-General, whose rooms will be on the ground floor, and there will also be a spacious apartment provided for deputations. The remaining rooms on the ground floor will be occupied by the Accountant-General and his staff, which is a very large one. There will be two other entrances from the street, one of which will be for the exclusive use of the telegraph staff. On the first floor the secretaries, solicitors, and the staff will be located. The whole of the second floor will be occupied by clerks, and the third floor will be taken by the telegraph department. In the centre of this floor will be the instrument room, 131ft. by 80ft., to the right and left of which will be smaller instrument rooms, and private rooms for the telegraph engineer and his staff. There will also be retiring rooms, lavatories, and refreshment-rooms. The corridors on each floor of the building will be 10ft. wide, and the rooms on every floor will be lofty, spacious, and well-lighted.

The principal front of the building will face S. Martin's-le-Grand, and will be 286ft. 5in. long. The ends, facing Newgate and Angel-streets, will each be 144ft. long. The building will be faced with Portland stone, set on a granite base, and will be bold and prominent. The existing General Post Office will be to a slight extent

dwarfed by its new neighbour, the height of the old building being about 50ft., while the new one will stand 20ft. above it. The ground floor will have an altitude of 15ft., the first floor, 16ft. 6in., the second floor, 15ft. ; the third floor, however, varies in height. The large instrument room will have a circular ceiling, 25ft. high in the centre, whilst the height of the other rooms on the same floor will be 18ft. The contract for the building, which has been taken by Messrs. Brass, of Old-street, S. Luke's, amounts to £129,718 17s., and the works are (according to the *Observer*) to be completed by December 31st., 1871. Mr. Williams is the architect.

MIDLAND COUNTIES MIDDLE CLASS IDIOT ASYLUM.

In reference to this competition, the following report has been received from Mr. Waterhouse, the gentleman nominated by the competitors as consulting architect.

Midland Counties Idiot Asylum.

To A. F. Godson, Esq., Hon. Secretary of the Committee.

Dear Sir,—I beg to report that since my appointment as referee, I have paid two special visits to Birmingham, to inspect the 15 designs submitted in this competition ; after a careful examination of them, I have formed the opinion, as I have had the opportunity of personally explaining to the committee, that the design bearing the motto "Comfort and Convenience" is, on the whole, the best, as regards its internal arrangements, its external architectural effect, and its general conformity to the conditions of the competition.

The design throughout is marked by great simplicity in its general construction and in its plan. The First Class Patients' Rooms are 12ft. square by 12ft. high. The dormitories for second class patients give 650 cubic feet ber bed, and the infirmary 1050.

The buildings proposed to be erected first would accommodate 104 patients, viz., 32 first class, and 72 second class, while the entire design shows accommodation for 268.

With regard to the important question of cost, the authors of "Comfort and Convenience" frankly state their opinion that the sum named (£8000) would be insufficient to carry out the first portion of the buildings, though I observe that some of the other competitors are sanguine of being able to accomplish it. I am myself inclined to think that the latter are mistaken, but if it should so happen that building operations can be carried out in the neighbourhood chosen by the committee at an exceptionally low rate, I must still express my opinion that the design "Comfort and Convenience," in the matter of cost, would be the most advantageous of the whole number for the committee to adopt, on account of its simplicity and the almost total absence of any mere ornamental features.—I am, &c.,

Alfred Waterhouse.

8, New Cavendish-street, W.
Feb. 24, 1870.

We are informed that the authors of the successful design are Messrs. Matthews and Quilter, of 10, Cloak-lane, London.

The design will, in due course, be submitted to the Commissioners in Lunacy for their approval.

DISTURBANCES IN THE LONDON BUILDING TRADE.

The quiet condition of the building trade in London since 1866, when the 1d. per hour advance was obtained by the men, has contrasted favourably with that of other parts of the kingdom ; there appear, however, to be unwelcome indications of approaching disturbances. Some weeks since, a number of builders resolved on an effort to reduce the wages rate one halfpenny per hour. On notice being given to the carpenters and joiners in their employ, the men expressed their determination to resist the reduction by every means in their power. Consequently—or from some other cause—one builder only—Mr. C. Aldin, of South Kensington, attempted to enforce the proposition, the result being the strike of the whole of his men. Unable to obtain men at the reduced rate, the establishment was re-opened at the end of a fortnight at the former wages rate of 8d. per hour, but employment was refused to any of the men who had struck.

A meeting of carpenters and joiners was held on Saturday at the King's Head, Ebury-bridge, Pimlico, when the following resolution was agreed to, after hearing the report of the strike committee :—"That this meeting is of opinion that the men arbitrarily victimised at the firm of Mr. C. Aldin for supporting the rights of the trade be supported by us until they obtain work elsewhere ; also, that the meeting sympathises with those men who have been discharged by the masters for collecting subscriptions in support of the strike at the above firm, and that they be placed upon the same footing as the men on strike with regard to being supported until they obtain re-employment."

A movement is also on foot amongst the carpenters and joiners for obtaining a reduction in the present hours of labour ; and at a meeting of 100 delegates, on Saturday, a committee of 30 was appointed for the purpose of bringing the movement publicly before the whole trade, with a view to combined action during the coming season. The rules for conducting the movement are being printed for distribution, and an aggregate meeting will shortly be held.

WIGAN INFIRMARY.

We this week publish a plan and view of a design by Mr. Thomas Worthington, of Manchester, for the new infirmary at Wigan.

The site selected is about half a mile distant from the town, and is well elevated above it. The entrance gates and lodge are at the angle of the land nearest to Wigan. The buildings are arranged so as to front the main road from Wigan. The administrative offices and dispensary occupy the centre, right and left of which are wings for males and females ; and in the rear of the offices is a two-story pavilion, for surgical or accidental cases.

A porch and vestibule give access to the central hall, on the right of which is a room for the matron or superintendent, in direct communication with the board room. The board has a private lobby leading from the central hall, with cloak room, lavatory and water-closet adjoining ; and a waiting room for patients in attendance on the board, immediately opposite. On the left of the central hall is the group of rooms appropriated to the dispensary department, comprising a patients' waiting room ; consulting and retiring rooms for the physician and surgeon ; dispensary; and separate entrance and exit from the grounds for the out-patients. This group of rooms is entirely separated from the other parts of the establishment, so that out-patients would have their entrance and exit without in any way coming into contact with the other inmates of the institution. The physician's and surgeon's rooms are each in direct communication with the waiting room. The dispensary adjoins the waiting room, with hatch at which the patients will hand in their prescriptions, and obtain their medicine. In the basement, under the dispensary, is the drug store and lavatory. Adjoining the dispensary is a staircase which communicates with the house surgeon's bed and sitting-rooms with bath-room, water-closet, lavatory, and similar accommodation for the dispenser. A similar staircase, on the opposite side of the central hall, communicates with the matron's private apartments, and with six bed-rooms for nurses and domestic servants, and a general store for linen, &c. A large cistern in the tower will provide for the general service of the establishment, and will afford an ample supply in case of fire.

The most central position has been selected for the kitchen and domestic offices, which adjoin the ward corridor, with serving counters on the male and female sides respectively. Glazed corridors on each side of the kitchen communicate with the central hall of the administrative buildings. The scullery and cook's pantry are on the same level with the kitchen. The larder and stores for kitchen use, with the beer and wine cellar, are in the basement under this part of the buildings, and are approached by staircases from the kitchen and from the central hall. The central court is at the same level as the basement floor, and has cart entrances with a sub-way under the glazed corridor, for the delivering of stores.

The ward accommodation provided is for 60 patients, 45 males and 15 females. Behind the kitchen is the male ward of 30 beds for surgical cases or accidents, having two small single-bedded wards for special treatment, or isolation after operation. This pavilion contains two stories of wards, of 14 beds each—Length of ward 58ft, width 26ft. height 14ft. = 108 superficial feet of floor surface, and 1507 cubic feet to each bed. The single-bedded wards are 12ft × 12ft. 6in. × 14ft. high, and contain each 2100 cubic feet. The levels of the ground have suggested, with a view to economy, that the ground-floor ward should be about 4ft. 6in. below the corridor level, which has the advantage of reducing the number of steps required to the upper floor. Immediately adjoining the staircase is the operating room, and the lift for raising patients to the upper floor. The nurses' room is placed between the large and small ward on each floor, with inspection windows to each ward. Ample water closets, bath and lavatory accommodation is provided in connection with these wards and the operating room. A window is placed between each bed, of tripartite construction, with swivel sashes and open hoppers close to the ceiling. Provision will also be made for admission of air near the floor, between each alternate bed.

The side pavilions, for 15 beds each, forming the two wings, are only one story high, and each contains a ward of 10 beds—length of ward 42ft. —width 24ft.—height 14ft. ; and a smaller ward of 5 beds, length 29ft.—width 20ft. These dimensions afford 1000 superficial feet of floor space, and 1411 cubic feet to each bed in the larger wards, and 1624 cubic feet in the smaller ones. Each of these pavilions has a spacious and airy day-room, with large projecting bay window overlooking the front part of the grounds and the high road. A nurse's room and scullery are placed between the wards and the day-room, with windows for supervision. The water closet will, in all cases, be cut off by ventilated passages. The positions of the fire-places generally, though in some respects different to the arrangement generally adopted in pavilion hospitals, have been practically tested with good effect. The greatest attention has been paid to warming, ventilation, &c.

The plan comprises detached mortuary chamber, with the separate wash-house and laundry, and has been arranged with a view to a future extension of 50 per cent, which may be obtained in a most economical manner by raising the two side pavilions an additional story, adding the required 30 beds.

SCHOOL OF ART.

Marylebone and West London School of Art.—The annual distribution of prizes to the students of this school took place on Saturday evening, the 19th ult., at the school-room, Portland-road, Mr. Peter Graham in the chair. From the report read by Mr. G. A. Stewart, it appeared that during the past year 479 students studied in the school, showing an increase over the former year of 98 students. In this number were representatives of 25 different trades or occupations. The rewards distributed were the result of the examination of the students by means of time work, done in the presence of members of the committee in March, 1869. In this personal examination 169 students presented themselves, of whom 105 passed, the superior merit of 27 of these entitling them to the mark "excellent." Many students passed in more than one subject. The entire number of papers successfully worked out was 139. The examination by the authorities at South Kensington of the works done by the students in the ordinary course of study during the year was satisfactory. 271 students sent up 1999 works, of which number the works of 76 students were marked satisfactory, 19 received book prizes, 4 honourable mention ; 20 works were selected for further national competition, and four students received Queen's prizes of books.

Exhibition of Drawing at Berlin.—An exhibition which is to be opened on the 10th and closed on the 24th of April next, will present some novel features intended to popularise and elevate the study of drawing. The exhibition is to be divided into three groups ; the first will comprise the models, the second all kinds of works executed by pupils, and the third, implements and drawing materials. The productions of the pupil must bear, besides the name, the age of the draughtsman, and mention how much time he has expended on the work ; it must also be stated whether he has copied from a model or drawn from nature. The idea of this exhibition originated among the drawing masters of Germany, and it will be carried out by a committee to which they have entrusted its management.





BLOCK PLAN

PROPOSED INFIRMARY, WIGAN.

THOMAS WORTHINGTON, ARCHITECT

REFERENCE TO PLAN.

A *Administration* B. *Female Wards* C. *Male Wards* D. *Male Accident Ward* E. *Kitchens* F. *Mortuary Chamber* G *Washhouse & Laundry* H *Lodge*

SCALE

60 30 0 60 120 180 240 300 600 FEET



J. ADAMS. LITH

Printed by Whiteman & Bass

Tower of St Nicholas' Church,

NEWCASTLE-ON-TYNE.

THE CARTHUSIAN PRIORY, OR THE CHARTERHOUSE, LONDON.

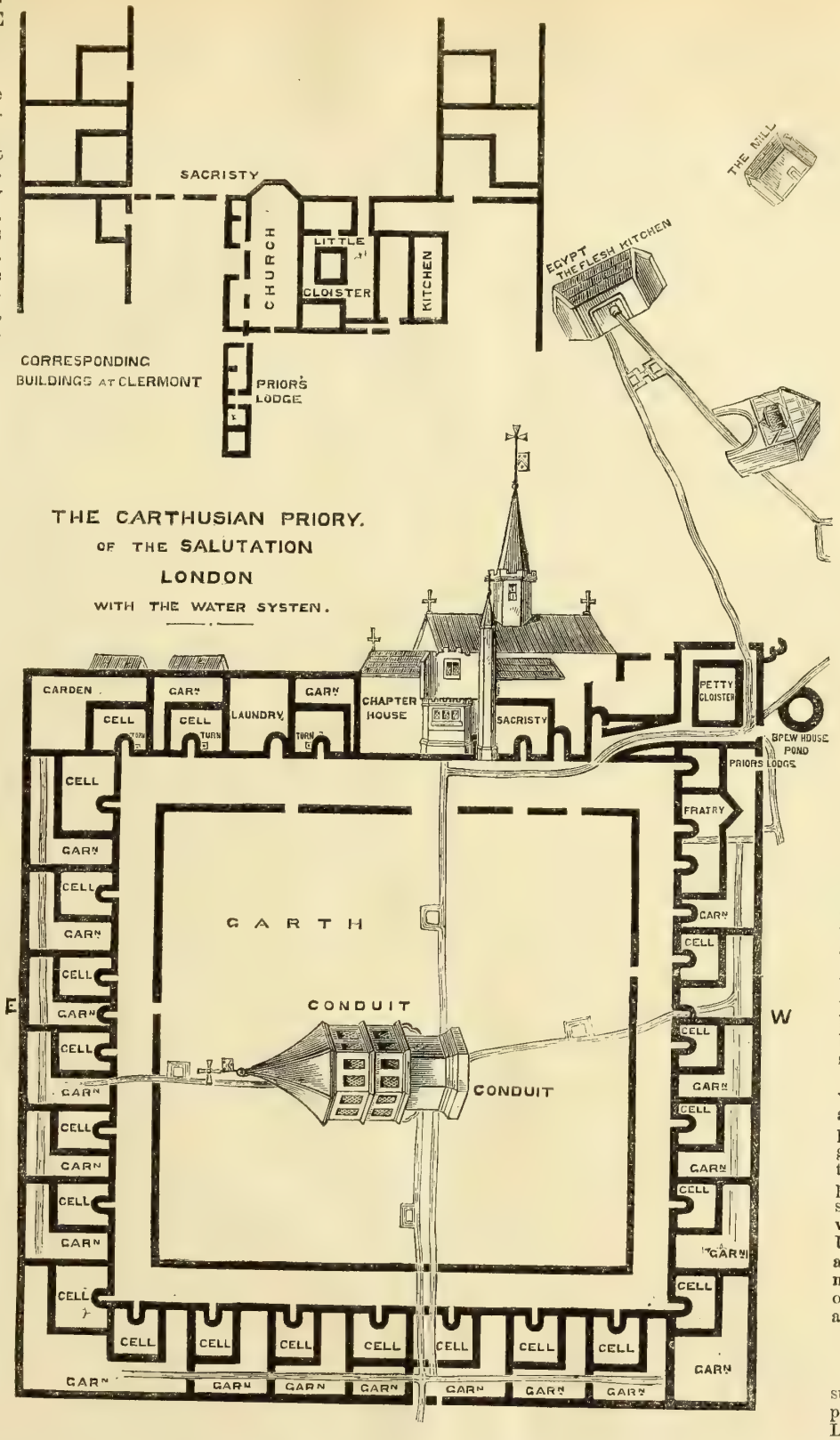
A GLANCE at the plan of the Charterhouse, 1511, shows how widely different it was from the arrangements of any other religious order. The Carthusian rule was for a body of solitaries. On the south was the great gate, still remaining, and opening into a court with the guest-house; at a short distance to the west, was the lodging of the lay brothers, or converts. A gateway leading to it is figured in Bearcroft's History. On the north was the Major Mansio, a large cloister garth surrounded on the west, north, and east, and partly on the south, by the twenty-three cells of the brethren, each containing a sitting-room, writing-room, and bed-room, with a little herb garden behind it. Three of the doorways, one with a turn at the side, remain on the west, under the alley of the modern cloister; there was also in the present century another on the N.E. side. The mound, which was the site of the northern alley, remains. The south-west side of the garth was occupied by the refectory, with the Prior's lodge; westward of it, abutting at the little cloister, the church, with a sacristy on the north side, and the chapter-house and laundry to the east of it. On the S.W. were a mill, a gateway, and a detached flesh kitchen, called significantly, Egypt. Hearne has given a bird's eye view of the later condition of the buildings, which is reproduced in Strype's Stow. At Clermont the little cloister lay to the south of the church, with the chapter-house at the east, and the refectory on the south; the Prior's lodge lying to the west of the church, and the Minor Mansio, with a guest-house, lay brothers' cells and chapel adjoining the gate on the south. The Certosas of Pavia and Florence present a similar arrangement.

In the Patent Ro. 36, Hen. VIII., P. xv., m. 6, the king gives to Sir Edward North, the whole church, belfry, cemetery, cells, cloisters, cellarages, solars, gardens, orchards, vineyards, and the cemetery called Charterhouse churchyard and its chapel, the west gate in S. Sepulchre's parish, and the east gate in S. Botolph's, without Aldersgate. There is unfortunately no survey in the Minister's Accompt.

The peculiarity of the Carthusian rule lay in providing a distinct cell or house for each inmate, as had been practised in the Egyptian, Greek, and Celtic monasteries, and at Christ Church, Hants, before the 11th century, but the practice of the West was adopted in providing a common refectory for use on certain days. The outer door of the cell was provided with a turn on one side, for the admission of food, or for oral communication. They appear on the plan near the laundry; another survives in the Benedictine cellarage of Canterbury. The door stood open only when two or more persons, coming on business by the Prior's license, were within the cell; but no brother might break silence except on emergency, or alarm, or when in want of bread, water, or fuel. A small stream ran through the little back garden. Potage and the daily pittance were brought to the cell, but raw herbs and fruits were the staple fare. They all contained a bed of felt or a palliasse, a pillow and coverlet of sheepskin, sewing and writing materials, two books borrowed at a time from the aumbry; two pots, two porringers, a bread pan, a cloth, a broom, two spoons, bread knife, drinking cup, flagon, ewer, saltcellar, plate and towel, a chopping axe, wood hatchet, tinder and flint.

Conversation was forbidden in church, hall, and cloister; but in the latter, intercourse, under restriction, was permitted with guests or visitors. Matins, Mass and Vespers were attended in church, but the hours were said in the cells. Confession in chapter was made weekly on Saturdays, besides private confession in the cells.

Mackenzie, E.C. Walcott, B.D., F.S.A.
58, Belgrave-road, S.W.



CANTERBURY CATHEDRAL.

ONE of our illustrations this week is a very fine view of a beautiful bit, a portion of the Cloisters, Canterbury Cathedral. Though now little else but ruggedly grand, sufficient detail has escaped the devastating hand of time to allow the archæologist to form a pretty exact idea of its original effect. The fine bold tracery is in an excellent state of preservation.

The plate is produced by a new process, patented by Mr. Wimbridge, of Rugby Chambers, 19, Great James-street, Bedford-row.

The drawing is made with a certain ink upon a zinc or other metal plate, and after undergoing various manipulations, a block in relief is produced in exact facsimile of the artist's work, touch for touch. Unlike lithography, it is as easy to draw on the metal with any ink as ordinary drawing in pen and ink on paper.

Directions for the Guidance of Artists.

1.—The pens most suitable for the above process are Gillott's Lithographic nibs for fine work, F nibs for anything requiring great freedom of handling, a quill will be found the most useful.

2.—The subject to be drawn should be traced, and the tracing having been laid upon the plate so as to reverse the subject, a piece of ordinary red chalk paper must be inserted between the tracing and the plate, after which, if the lines be gone over with a tracing point, a reversed outline of the subject will be found in red upon the plate.

3.—Having gone thus far, the artist may now commence to draw the subject in ink; for this purpose pour a small quantity of the ink from the bottle into a small Indian ink saucer, and then proceed to draw as with Indian ink upon paper, taking great care not to breathe upon the plate, as this is liable to cause the ink to run; the artist must also be careful not to touch the surface of the plate with his hand, as any grease upon the plate would probably result in the failure of

such parts of the drawing as occurred upon the greasy portion of the plate. This can be easily avoided by using the rests for the hand. The drawing being finished, it should be carefully placed in its box and forwarded to the patentee, who will return it in the form of a block, ready for printing in a few hours.

4.—For geometrical drawings the ordinary drawing instruments are used the same as if on paper.

5.—The ink, plates, hand-rests, red paper for re-tracing, and all other requisites can be obtained of the patentee.

STREET PAVING IN NEW YORK.

AN experiment in street paving is reported from New York, which has interest for other cities as well as the one in which the experiment was made. The Common Council of New York permitted a private company to do the pitching of the whole thoroughfare of the aristocratic Fifth Avenue. The mode of operation resorted to was to pour some 4in. of tar over the granite blocks of the old roadway, and fling into this bed a quantity of soft limestone, rolling it over by very heavy pressure to a smooth surface. Very soon the traffic cut this up so as to resemble a snow road after a few days of thaw. The concrete was then renewed, and the populace termed it in derision the "poultice pavement." Everybody complained of it. The ladies said the tar ruined their dresses and boots; the coachmen protested that their carriage springs were broken by the continual jolting into and out of the cavities which were speedily worn in the soft concrete after each renewal; and housekeepers made outcry against the destructive gritty dust which arose from the road in dry weather. By-and-bye the property-holders demanded the interposition of the Board of Health, and an examination made by that body revealed worse mischiefs than the destruction of new boots and carriage springs. A single blast of the dust-charged atmosphere at a street corner meeting a delicate lady riding past in an open carriage has occasioned hemorrhage of the lungs. Forms of ophthalmia, "more distressing and aggravated than any hitherto known to the profession," have been brought on from exposure to the gusts of this street. "Diseases of the lungs, of the throat, of the heart, of the liver" are all enumerated as traceable to the dust generated by the "poultice pavement." The quarter was fast becoming deserted, the fashionable residents preferring to shut up their fine houses and go to other parts of the city, when the Common Council who had permitted the experiment gave orders to restore the street to its former condition. The damage to property alone, in the shape of "defiled white marble porticoes and the defacement of luxurious furniture," is estimated at "hundreds of thousands of dollars."

ARCHITECTURAL SOCIETIES.

Liverpool Architectural Society.—On Wednesday week the tenth meeting of the present session of the Architectural and Archæological Society of this town was held. The chair was occupied by Mr. F. Horner, president of the society.—Mr. Boult stated the results of some experiments on the strength of cement, and gave it as his opinion that it would not be safe to use cement for flooring without testing every barrel.—The President read a letter from Messrs. J. B. White and Sons, who took exception to the results of the experiments on the strength of cement (see last number of The Building News) which had been read at the previous meeting of the Society by Mr. Boult, on the ground that they were unfair to themselves. They enclosed the results of another series of experiments of the came nature. It was resolved that the letter be acknowledged, and that Messrs. White and Sons be informed that it was not the business of the society to advocate the claims of rival manufacturers, but that they would have no objection to print the results of the experiments communicated by Messrs. White.—The paper for the evening was read by Mr. W. H. Picton, A.R.I.B.A., on "French Suburban Villas."

Northern Architectural Association.—A special meeting of the members of the Northern Architectural Association was held on Saturday, the 26th ult., at the Old Castle, Newcastle-on-Tyne Mr. Thomas Oliver, president, in the chair, for the purpose of taking into consideration and preparing a report upon the minutes of proceedings of the eighth annual meeting of the Architectural Alliance. After a lengthened discussion on the several subjects contained in the minutes, a report was adopted, and the Secretary was instructed to forward it to the Secretary of the Alliance previous to the next annual meeting.

PARLIAMENTARY NOTES.

Stamps on Building Leases.—On Friday last Mr. Bourke brought under the notice of the House of Commons the practice adopted by the Commissioners of Inland Revenue during the last four years of charging beyond the *ad valorem* duty upon leases an additional amount of 35s.; and the remarks of the hon. and learned gentleman were followed by a chorus of complaints from all parts of the House, and a succession of appeals to the Chancellor of the Exchequer to propose some legislation which may remove all doubts as to the validity of leases which are now said to have been insufficiently stamped, and relieve their holders from any liability to penalties. Mr. Lowe defended the action of the Commissioners, and at first seemed disposed to put off all legislation upon the subject until he can find an opportunity to introduce a bill for the general revision of the Stamps Acts; but at last the pressure was too great even for his powers of resistance, and he was induced to promise that he will bring in a bill with as little delay as possible. Even after this undertaking had been extracted from the Chancellor of Exchequer, there was some disposition to continue the debate; but upon an appeal from Mr. Gladstone the House consented to postpone further discussion until the promised measure is upon the table.

Water Supply on Sunday.—Mr. Stapleton gave notice on Tuesday evening that some day before Easter he would call the attention of the House to the neglect of the companies which had the privilege of supplying water to the metropolis for domestic purposes on Sundays, and to the great injury thence resulting to the public health.

The Rivers' Commission.—Mr. James Howard asked the Secretary of State for the Home Department how many reports were expected from the Rivers Commission, in addition to those already received, dated respectively March 29, 1866, May 6, 1867, August 15, 1867, and February 10, 1869; and when it was expected the commissioners would have completed their inquiries?—Mr. Bruce said that the commission had not yet closed its inquiry, and the subject was hardly yet ripe for legislation. He hoped that next session he would be able to introduce a bill founded on the reports of the commission.

Tramways.—Mr. S. Lefevre moved for leave to bring in a bill to facilitate the construction and regulate the working of tramways. He said there were 27 companies formed for the construction of 515 miles of tramway, involving an expenditure of £14,000,000. In London there were seven companies, proposing to lay 125 miles of tramway. Previous to this year he could not make out that more than five or six private acts had been passed for the construction of tramways, three of which were passed last year for the metropolis, and one was introduced this year for Liverpool, and two for Salford and Birmingham. It was attempted to show that the committee last year authorised the bills for the metropolis by way of experiment, but he was informed that that was a mistake, and that the bills were passed on their merits. No one who had read the evidence taken by the committee last year could doubt that tramways were a great public convenience, that they tended to regulate the traffic and keep it in straight lines, and that they were a great comfort to passengers. The only question was by whom they were to be made. He had just received deputations from several northern towns, who stated that the local authorities wished to make the lines themselves. That was one question to be considered by the House; and another was what regulations should affect the lines when they were made, and also what should be the relations between the bodies who made the lines and the companies who worked them? All these questions were discussed in the committee of last year, and he thought that the better way would be to bring in a general bill, and in the meantime to suspend all action in the private bills before the House. He proposed that the local authority, after obtaining a certificate from the Board of Trade, should proceed to make the tramway, and sell it if they chose, or companies might make them in the event of the local authority not doing so, having first obtained a certificate from the Board of Trade. Some of the clauses provided for the purchase which was to be made, and in such a manner as to prevent any absolute monopoly in the tramways for a longer period than 21 years. The purchase would only include the actual rails and rolling stock. It was also provided that companies laying tramways down should be registered as joint-stock companies. Though the bill gave power to local authorities to make tramways, he thought in the main they would be constructed by private companies. It would, however, be in the power of local authorities to determine the whole system. Great difficulty would be experienced in London, and therefore he prohibited the vestries from laying down tramways without the sanction of the Metropolitan Board. He had every desire the subject should be fully considered, and therefore he proposed that the bill, after being read a second time, should be referred to a select committee.—Leave was then given to bring in the bill.

BUILDERS CLERKS' BENEVOLENT INSTITUTION.

The third annual meeting of this institution was held at the office, 14, Bedford-row, on the evening of the 24th ult., Thomas Stirling, Esq., the president, in the chair.

In consequence of the issue of a circular containing some proposed alterations to the rules, there was a numerous attendance of the subscribers.

The Secretary having read the advertisement convening the meeting, and also the report and balance-sheet, the Chairman, in a stirring speech, reviewed the progress of the institution, from its foundation three years back to the present time, dwelling upon the facts that in spite of the untoward aspect of external affairs and the consequent extra difficulties to contend against during that period, the success attained had been very great. Up to the date of the present report the receipts were about £1190, of which he found that £600 were invested in Government stock—a most wise precaution, and laying the foundation of a secure income in the future; £150 were on deposit at the bankers, gaining interest; the balance of the current account was ample, nearly £80 had already been expended upon the objects of the institution, and the total expenditure for management had been about £290. Since the date of the report the committee had expended, under rule 5, a further sum of £20 to assist cases of sudden distress, which would make nearly £100 total expenditure for pensions and relief.

The report and balance-sheet were unanimously adopted.

At the conclusion of the formal business of the meeting, Mr. Webb brought forward a proposition to alter rule 4, section 9, to clearly settle the point whether a widow could claim the half of her deceased husband's pension, or whether it should be optional with the committee to grant it. He did not consider it proper that any benevolent institution should be liable to have any legal claim upon it for relief, but that discretionary powers should be vested in the committee.

Mr. Bayes proposed an amendment that the rule should remain unaltered. Very careful consideration had been given to the framing of the rules, and he thought this one quite plain enough. It rested with the committee to prove the eligibility of every candidate, and if allowed he thought they should be fairly entitled to the half pension.

The amendment being put to the meeting was carried by a majority of 11.

Mr. Alford R. Smith then brought forward a proposition to alter the rules so as to allow the widowed mother of a builder's clerk the benefit of the institution. Since sending in the formal notice, he had reconsidered the matter and wished to put the alterations in a different shape so as to embrace certain restrictions.

The Chairman ruled that it would be out of order, but suggested that the original proposition should be moved, and some one else should propose the second consideration as an amendment.

Mr. T. P. Ward asked if rule 17 section 2 had been complied with, as he had seen no particulars of the proposed alterations advertised?

The Secretary explained that he had received one month's notice in writing of these alterations, with full particulars, and that he had given fourteen days' notice by advertisement according to the rule. That he had also appended full particulars to the report, which had been circulated amongst the subscribers.

Mr. Ward insisted that the rule had not been complied with, as the full particulars had not been advertised, and he had only received the circular three days previously.

Mr. Graystone considered that the rule had been strictly complied with, and thought the question ought not to have been raised, as it was interrupting business; the rule was very clear, and had been acted upon to the very letter.

The Chairman took the opinion of the meeting upon the point; and a majority of 5 decided that it had not.

This having stopped progress, Mr. Newton proposed "that the notice given be taken as sufficient," which was carried, but Mr. Smith declined to again bring forward his proposition. Another gentleman had been allowed to have his alteration discussed before this question had been raised, and it seemed to be all out of order; he should raise the question again at the next annual meeting, and would see that there was sufficient notice given.

The question excited considerable interest and caused some after discussion.

The meeting terminated at a late hour upon the Chairman briefly replying to the usual vote of thanks.

Street Tramways and Surplus Road Metal.—A question has been raised by the Lambeth Vestry as so the justice, or otherwise, of allowing the tramways companies to claim the material taken off the road where they construct their lines. The matter is to be referred to the Board of Trade for settlement, the expenses to be borne jointly by the company and the vestry.

Building Intelligence.

CHURCHES AND CHAPELS.

SUNDERLAND.—The new Trinity United Presbyterian Church, erected in Park-terrace, Sunderland, was last week opened for public worship. The building is designed in the Gothic style of architecture, and is built entirely of stone. The church is capable of accommodating 800 persons. In addition to the church and school room, a session house, vestry, and keeper's rooms, with conveniences, are attached. The total cost, exclusive of site, is about £3,500. Mr. Thomas Oliver, of Newcastle, was the architect; Mr. H. Andrews, the clerk of the works; and the contractor for the whole of the works, Mr. Robert Allison, of Whitburn.

MORDEN.—Morden Church to be rebuilt, at the cost of Mr. J. S. W. Drax and Miss Drax. Workmen have already commenced operations, under the direction of Mr. Joseph Sellers, architect and builder to Mr. Drax.

EAST SHEFFORD.—The new church of the Holy Innocents, East Shefford, Oxfordshire, was consecrated on the 23rd ult. The building is in the Early English style. It is a simple church, without aisles, but with arch dividing the chancel from the nave. On the south side is a convenient vestry. The walls are unusually thick. The tracery and door jambs are of the best Bath stone, and the exterior of flint, interspersed with stone bands. A bell-cote surmounts the west end, built sufficiently commodious for two large bells; the whole is finished completely with Bath stone. The cost was about £1500. Mr. C. F. Hayward, of 20, Montague-street, Russell-square, was the architect, and Mr. T. Wooldridge, of Hungerford, the contractor.

BRIGHOUSE.—On Friday, the Bishop of Ripon consecrated a new church at Brighouse, dedicated to S. James. The church is a neat Gothic structure, built from the designs of Messrs. Mallinson and Barber, architects, Halifax. The church is divided into nave, north and south aisles, chancel, and organ chamber, and contains seat accommodation for six hundred people. The cost was £3800.

CHESTER CATHEDRAL.—A statement of the progress made with the restoration of Chester Cathedral was given by Dean Howson at a semi-private meeting held recently in the council chamber of Liverpool Town Hall. Mr. G. Scott's estimate of the cost of a complete restoration of the building is £55,500, and towards this sum £39,000 had been subscribed up to the end of last year. The necessity of completing the work was strongly urged, and in order to further that object it was arranged to hold a public meeting in Liverpool in June next.

EAST HORSLEY.—The parish church of East Horsley, Surrey, was re-opened on Tuesday week, after restoration under the direction of Mr. H. Woodyer, architect. A few months ago the building was defaced in every part of the exterior with a covering of compo, and in the inside things were still worse—arches had been bricked up, the pillars on which these arches stood had been half buried in earth which had been wheeled within the church to raise its floor to the level of the churchyard, and the upper portions were completely lost in hideous high pews, which literally rose above the capitals. There was an ugly gallery at the west end, and a worse than ugly window at the east. The church was originally dedicated to S. Martin, and is one of the oldest in the county, but a "restoration" which it underwent about fifteen years ago is said to have denuded the exterior of every interesting characteristic. It consisted of nave, chancel, south porch, and massive west tower, the nave being divided from the chancel by an Early English arch. Although in the present work of restoration the north wall of the north aisle, and the tower, are the only relics of the past, the architect has entirely preserved the old style of architecture. Great use has been made of polished red Devonshire marble; the roof is, of course, entirely renewed, and the old high square pews have been supplanted by strong oaken benches. Maw's encaustic tiles form the floor within the Communion rails, and the church is heated with hot air on a plan introduced by Mr. Perritt, of Bolton. Messrs. Swayne and Son, of Guildford, were the contractors for the whole work.

PONTYPOOL.—A new church is to be erected at Pontypool, from a design by Mr. William Adams, architect, of Newport. It will comprise porch, nave, and chancel, with a vestry on the east side. The chancel and altar are to lie on the north, instead of the east. The style adopted by the designer is Early English. The foundation will be of Pennam stone, and the external walls will be of the same material, relieved by ornamental courses of red bricks.—The Wesleyans of Coedy-gric, near Pontypool, are about to erect a new chapel, from plans by Mr. E. A. Lansdown, Bristol and Newport, architect.

WALWORTH.—A new church, dedicated to S. Stephen, is to be erected on the Walworth-common estate, in the parish of Newington. The style adopted is Gothic, Mr. Henry Jarvis being the architect. Mr. Tarrant will be the builder.

TROWBRIDGE.—On the 24th ult. the new church of S. Thomas, Trowbridge, was consecrated. The style is Early English, and the church is built from the design of Mr. William Smith, architect, and builder, of Trowbridge. The exterior is of Atworth stone, the interior being faced with Bath stone. The plan is almost cruciform, being 66ft. from east to west by 55ft. from north to south. The east window is by Hardman and Co., and the tiles with which the whole building is paved were supplied by Maw and Co. The total cost was £7000.

BUILDINGS.

ISLINGTON.—New schools for the district of S. Silas, Penton-street, Islington, were opened on Friday last. The building is constructed on the approved Government plan, the rooms being lofty, and well ventilated and lighted. There are three schoolrooms—one on the basement, for infants, one on the first floor, for boys, and one on the second floor, for girls. These are provided with appropriate class-rooms, offices, &c. Accommodation is provided for 511 children. The total cost of the building was £3448. The style adopted is Gothic, Mr. Clare being the architect, and Messrs. Dove Bros., the builders.

VAUXHALL.—New schools have just been opened in the Ponton-road, Nine Elms, Vauxhall, affording accommodation for 190 children. Messrs. Lee and Sons, of Whitehall, are the architects, Mr. Samuel Puttick, of Nine Elms, being the builder. The total cost of the buildings is about £115, exclusive of the site, which was given by Messrs. Thorne.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

P. O. O's. to be made payable to J. Passmore Edwards, at the Strand Office. All cheques to be crossed on the Union Bank.

ERRATUM.—In our report of the discussion on the King's Cross station roof at the Civil and Mechanical Engineers' Society in our last number, the name of Mr. A. T. Walmisley, A.K.C., should have appeared in the first line instead of that of Mr. Bancroft.

RECEIVED.—H. T. G.—A. C. and Co.—H. S.—S. S. and Co.—J. Barras—P. Le R.—Gilbert R. Redgrave—A. J. J.—W. O. C.—T. B.—E. C.—C. B. A.—J. N.—J. B.—J. L. W.—J. Walker—S. C. and J. P. S.—John Pigott, Jun.—J. B.—R. S.—J. M.—W. Woodward.

Correspondence.

MODERN STAINED GLASS IN GLASGOW CATHEDRAL.

(To the Editor of THE BUILDING NEWS.)

SIR,—Mr. John P. Seddon, in your last number, gives out his opinions on the stained glass windows of our cathedral, with a freedom and assurance rarely exhibited, except by the presumptuous and thoughtless novice in art; and we must know something more of Mr. Seddon, of his capabilities and attainments, before we attach the slightest importance to his strictures.

Mr. Seddon's description of the effects produced by these windows, taken either collectively or individually, is simply an hallucination of his own; and the crude colouring and comical effects he saw in them are only to be accounted for by defects within himself. Not only are the citizens of Glasgow well satisfied with these windows, but so also are the educated Englishmen, and other foreigners, who in crowds visit the Cathedral every season; all unite in declaring it to be the noblest display of painted glass within the kingdom.

If Mr. Seddon knows something of the subject upon which he so freely offers his opinions, let him tell us, at his leisure, what are the defects he so much condemns, and from what causes they spring; and, further, let him tell us wherein consists the difference of treatment and execution, as shown in the Munich windows here, from that displayed in the windows here by the Scotch, English, and foreign glass painters who have been employed in the decoration of our Cathedral; and let him select from these those of them he thinks superior to the Munich windows.

He had abundance of examples before him when he visited this church, there being no less than nine windows by Mr. Hughes; three by Mr. Wailes; four by M. Capronnier, of Brussels; three by Mr. Ballantine, of Edinburgh; four by M. Scheinert, of Dresden; three by M. Bertini, of Milan; three by Messrs. Clayton and Bell; one by Mr. O'Connor; twelve by Mr. Willement; and one by Messrs. Heaton, Butler, and Bayne.

By doing this, Mr. Seddon may perhaps open our eyes, perhaps his own.

His charitable supposition that our citizens "have had but few opportunities of seeing high artistic work appropriately treated," is very considerate, no doubt; but let me ask, what better would they be in London, according to Mr. Seddon's showing? Let me tell him that the donors of these windows are gentlemen of position, learning, and refined taste; that the citizens of Glasgow travel much, and see more than most Londoners, and have less of that arrogance of manners and forwardness of speech which makes the Englishman so shunned abroad.—I am, Sir, yours, &c.,

ST. MUNGO.

Glasgow, March 1, 1870.

[The writer of the above encloses his name, with the words, "not for insertion," underlined by the side of it, as if he were half ashamed of his sonorous utterances. Whatever may be the value of Mr. Seddon's criticisms, he had the courage to attach his name thereto.—ED. B. N.]

COLOUR.

SIR,—Perhaps some of your readers would be kind enough to explain the following transmutations of colour.

Take a piece of glass of ultramarine tint and look through it on a garden when the sun is shining strongly—be careful to shade the eyes from all external white rays; at first all seems cool and blue, but by degrees all the green leaves that catch the sunlight (from the light green of young shoots to the dark green of Irish yew) turn to an intense crimson.

I at first thought that this was a case of a colour (red) not surrounding but actually taking the place of its complementary (green), but I found that no other green, besides that of leaves, would produce this effect. Paint and coloured cloth, from emerald to olive green, merely become paler and bluer.

Next, in looking through the same glass on ultramarine, it appears green—that is to say, it changes into its complementary plus the blue glass. On looking at orange (complementary of blue) it becomes pink, perhaps because it was a deep orange. A lighter orange, almost a buff, however, turned white.

Allowing for the differences to be expected from not being able to use absolute colours, the results are not so even as to enable me to determine the *rationale* of the changes. Perhaps some of your readers may enlighten me. I may add that I have made use of other persons' eyes besides my own, with the same result.—I am, &c.

EDWARD COOK.

Northampton, Feb. 26, 1870.

DR. ZERFFI AND THE HISTORICAL DEVELOPMENT OF ART.

SIR,—Your correspondent "P. E. M." should learn moderation in writing on a subject of which he is completely ignorant. His expressions of "falsehood and nonsense" are much more applicable to his own production than to Dr. Zerffi's excellent lectures, of which, I may add, my report is but a bare outline.

On the subject of Jewish art, I quote the following from a lecture by Emanuel Deutsch, of the British Museum:—"With the settlement of

the nation into a properly regulated commonwealth, one looked for the growth among them of the arts and sciences, but the result was far from satisfactory. I do not think they invented, or even developed to any considerable extent, any single branch. When the time came that Solomon built his temple they whose fathers made bricks for strangers *had to send for the Phœnicians* to erect their sanctuary. One occupation alone, the tilling of the soil, seemed to have been after their heart."

"P. E. M." forgets to name any of the "many well-known artists" whom he alludes to.

His remarks on the influence which the sea exercised in the development of Greece are characterised by a shallowness unworthy of that subject. Permit me one or two quotations. Thirlwall, in his "History of Greece," and Schlegel, in his "Philosophy of History," make the same remark which "P. E. M." takes exception to in Dr. Zerffi. Goethe says in one of his reviews, (Vol. XLV. p. 227,) "Perhaps it is the sight of the sea from youth upward that gives English and Spanish poets such an advantage over those of inland countries." Julius Charles Hare, in his "Guesses at Truth" (p. 72) writes: "To us, who have been familiar with the sea all our lives, it might almost seem as though our minds would have been 'poor shrunken things,' without its air to brace and expand them," and speaks again of "those who, not knowing the sea, have no salt to season their thoughts with." In another place he says "That it has been an essential condition in the civilizing of nations all history shows." A recent number of the *Saturday Review* points out the same thing in reference to Holland. It says, "The golden sun of the south enters not these northern latitudes, neither does the broad swell of the Atlantic sweep into the narrow and chopping seas, and such as are these aspects of nature, such has been the phase of Dutch art."

Natural scenery is not the only, but it is probably the most important motive in a nation's progress. But it would be as reasonable in "P. E. M." to expect that the physician who cures him of the small-pox should preserve his life for ever afterwards, as that the cause of a nation's prosperity should absolutely prevent its decay.

I shall not quarrel with your correspondent for denying that the Doric order is characterised by simplicity. His views on this subject are undoubtedly much more original than those of Dr. Zerffi.—I am, &c.

The Writer of the Report.

PLYMOUTH GUILDHALL COMPETITION.—WHAT IS A REFEREE? &c.

Sir,—It never occurred to me that an architect writing on this subject could by any possibility be misunderstood, by an architect, as referring to any other than a *professional* referee.

Mr. Hayward seems determined to avoid committing himself to a decided opinion. Surely, after a consideration extending over a period of four years, he must have formed some definite views on the subject, which he could impart, instead of "a few notions which I do not claim as all my own, but as being held variously in various ways."

Writing thus in your impression for Feb., 18, it is not surprising that Mr. Hayward has rather obscured than otherwise the subject under discussion, more particularly by mixing together two questions which should be considered separately—the award of premiums and the selection of a design for execution. The premiums, if rightly awarded, are the expression of superior, as well as of relative merit, *viewed in the light of certain conditions and instructions* which only a professional man can properly interpret or appreciate; and, for this reason, they should follow the professional selection. The premiums may or may not indicate the designs best adapted for execution, and, therefore, should not *necessarily* govern the final selection, which, with the responsibility attaching to it, must, of course, rest with the promoters.

From a professional point of view (the only one from which it is worth considering the question, as we cannot impose obligations on promoters), I look upon a referee and an arbitrator as the same, the latter term only expressing more fully the function which should attach to the office—that is, to decide or judge. "To examine and report on the various plans, and the probable cost at which they can be erected," and no more, does not require the services of an eminent architect. Any clerk in a borough surveyor's office might prepare a tabular statement of the sizes of the various rooms, &c., as compared with the dimensions required by "instructions," and might calculate the cubic contents of each design and lay them before the promoters. He might certainly feel at a loss in returning the different styles in which the designs were conceived, but that is not essential, as the promoters in such a case reserve the strictly architectural and the æsthetic "department" for themselves.

As a rule, architects who are employed as referees are not *formally* recognised as arbitrators by the promoters, but *virtually* they are, for they invariably make a selection of designs; and it is the exception, I believe, for a committee to award the premiums contrary to the professional decision. But whether or not, or whether or not he exceeds his instructions in doing so, in so far as a referee selects a certain number of designs and declares them to be in a certain order of merit entitled to the premiums, he is virtually an arbitrator or judge between the promoters and the competitors in regard to merit. And his position as such, if not formally, is, I consider, tacitly and virtually admitted by the competitors, unless reasonable ground of objection has been raised by them to the person selected for the office. My opinion is that a referee should not undertake to do less than this; therefore, that the office "should not be accepted on any other understanding than that of arbitrator between the competitors and the promoters;" and I believe that no architect who respects his position and wishes to avoid being made use of as a screen for the perpetration of "jobbery" would otherwise accept it. I know of at least one instance in which an architect of older standing than Mr. Waterhouse declined to act on instructions similar to those given in the Plymouth case.

If it is at all obligatory on competitors to support the award of a referee, I presume it is from consideration of its being a *professional* decision rather than as the decision of an arbitrator in the ordinary sense. If so, I cannot see because a referee is not "an arbitrator properly constituted" (which I suppose a referee never will be if Mr. Hayward means one formally agreed to by each party concerned, by deed of submission, &c.) that the competitors are exonerated from their professional obligations. For instance, had the Plymouth Town Council proposed that an arbitrator with full powers should be appointed, or a referee by whose decision they would agree to abide, and at the same time had named Mr. Waterhouse for the office, would not Mr. Hayward and the other competitors have applauded the proposition, and could they have refused to agree to the appointment of an architect of Mr. Waterhouse's position? Now is it to be supposed that the award of Mr. Waterhouse, under these circumstances, would have been different to what it was when his position was less formally recognised? I think not. Yet because in one case the referee was "an arbitrator properly constituted," Mr. Hayward would "uphold his decision;" whereas, impliedly, in the other case he would not, *and practically he did not.* In other words (as Mr. Hayward seems to hold), the ignoring of the position and of the award of a referee by promoters exonerates the competitors from their professional obligations to support them! When promoters in such a case *admit that they have acted wrongly, what then?*

As it is useless to attempt to impose obligations on the promoters of a competition, it is idle to expect that the relations between committees and the profession can be rendered clear and exact by such means. If reform is to be effected in competition practice, it must be through the profession, indirectly through proper professional views being taken *and acted up to* by referees when they are employed, and by competitors. So long as the observance of professional obligations is looked upon as "simply puerile," we cannot expect much.

While maintaining that a referee should be regarded as an arbitrator, *in respect to the premiums*, I had no intention of denying to promoters their right of judgment in the selection of a design for execution—the, really speaking, only point which, practically, concerns them. This is a totally different question from the awarding of premiums; and the distinction has been so clearly and fully laid down in the "German Competition Code," recently published, that I need not occupy your space by enlarging on it.

In his former letter Mr. Hayward made some allusions not exactly bearing on this question, being "personal" and "referable to facts," which I would briefly notice.

It may be in your recollection that Mr. Waterhouse, who acted as referee in this competition, awarded the second place to my design "Nina," and the third to Mr. Hayward's "Ich Dien;" that the committee confirmed his award or selection; but that the Town Council reversed the positions of these designs, and awarded the premiums accordingly. It is this interference on the part of the Council, I presume, which Mr. Hayward refers to as "the partial correction of what I might surely deem an injustice"—the "injustice" being, apparently, that Mr. Hayward's design was not placed first by the referee, instead of third—the "partial correction" its being advanced by the Council to the second place. Passing over the implied superiority of a Town Council to a professional referee in a matter of technical adjudication which this observation conveys, I would merely observe that this same Town Council, which Mr. Hayward commends for their partial correction of an injustice on the 13th of October, very frankly admitted, on the 9th inst., that this partial correction "*was arrived at confessedly through a mistake*;" and, as Mr. Reid informed you last week, it has been thought right to equalise the premiums, "and thus remedy the mistake that had been committed."

My allusion to local influence (Building News, Oct. 29), which Mr. Hayward interprets as "a most unworthy insinuation" against him was but a general allusion, and, as such, was fully warranted, I think, by the circumstances I then referred to. Mr. Reid's statement in your last number, however, would seem to justify the expression of a stronger opinion.

Under the circumstances I do agree with Mr. Hayward that I was "lucky to obtain any place at all," but not for the reasons he would seem to suggest. I do not exactly understand his allusions to my design—what he means by "good in the abstract," and "a much finer set of architectural sketches than any exhibited," and yet "utterly out of place." For one professing a disinclination to "pick a single hole in other designs," *utterly out of place*, is rather strong language, but not so strong as Mr. Hayward has thought fit to use elsewhere. Mr. Hayward is quite at liberty to prove, to his own satisfaction, that his own design is the best (though the manner of his doing so may be open to question), but not to indulge in disparaging, and even offensive observations regarding the designs of others.

Mr. Hayward refers me to Mr. Waterhouse's report and letter, which, judging from quotations made "elsewhere" in favour of his design, I believe I am already more conversant with than Mr. Hayward himself. Mr. Waterhouse's supplementary report, which I append for insertion (if not trespassing too far on your space) has not been made public, that I am aware of. Strange to say this document does not contain any reference to "Ich Dien."—Yours, &c.,

Belfast, February 22, 1870. W. Henry Lynn.

MR. WATERHOUSE'S SUPPLEMENTARY REPORT.

8, New Cavendish-street, Portland-place, W.,
15th Oct., 1869.

"My dear Sir,—I have received a letter this morning from a gentleman on the Plymouth Town Council who asks my opinion of the design for the Guildhall under the motto 'Civis,' and my objections to that of 'Servabo Fidem' if executed in stone; whether I consider 'Fiat Justitia' gives a satisfactory and harmonious whole; and what design out of the 25 I consider best, irrespective of cost. I believe I ought not to answer this letter except through you. I therefore trouble you with my reply, to be used, or not, as you may deem best.

"1. 'Civis' exhibits a very carefully prepared set of drawings; but too obviously does this design follow that of another public building in the North of England (with its defects). The street between the blocks is too narrow. There is a Guildhall as well as a Public Hall, and the former though comparatively small (75 by 45), is 105ft. high.

"2. 'Servabo Fidem' is in one block, and therefore difficult to build except at once. The hall and corridors are excellently arranged, but the staircases are poor; there is no van yard, the treasurer is badly provided for, Grand Jury accommodation is inadequate, jury retiring room far removed from Civil Court. The cost of this design would, in my opinion, exceed that of 'Fiat Justitia" by 25 to 30 per cent.

"3. In spite of the heavy pillars of the Hall, I consider 'Fiat Justitia's' design to be architecturally a great success, or I would not have spoken of it as I did in my report.

"Lastly. If cost be altogether set aside, I am of opinion that 'Nina' decidedly bears off the palm.—Believe me, yours very truly, A. Waterhouse.

"C. C. Whiteford, Esq. (Town Clerk)."

P. S.—I have not had an opportunity of comparing the premiated designs as regards either merit or cost; but, on the latter point, which would seem to have influenced Mr. Waterhouse a good deal in his selection, I observe that a local competitor, in writing to the Town Council, on the 8th inst., stated, with reference to the three premiated designs, that "having tested each of them by measurement with, and prices of, similar buildings recently erected in different counties, I am prepared to assert that there is very little, if any, difference in the cost."

March 1.—Mr. Hayward's letter in your last impression contains the following:—"'Nina's' estimate is said to be £40,000, and Mr. Waterhouse states 'the cost would far exceed the sum suggested, indeed, the author himself to a certain extent admits it." This, while it is literally true, is *economically* so. As Mr. Hayward puts it, Mr. Waterhouse's observation would seem to refer to the £40,000, as being the "sum suggested;" whereas, in the report, it refers to the £25,000, or sum suggested by the council, as the limit of expenditure.

"Nina," as well as "Ich Dien," provided a considerable amount of extra accommodation. This fact, and the slight difference (£230) between the two estimates, were not declared by the Town Clerk *when* "Nina" *was under discussion*. It was the suppression of these facts, which I quite agree with Mr. Hayward "would have been unfair in anyone," that led the council into the error which has since been admitted.

W. H. Lynn.

Sir,—Few, if any, members composing the Royal Institute of British Architects have suffered more than myself in supporting the honour of our profession; and it was for the general good thereof I addressed you in reply to Mr. Hayward's letter of the 11th inst.

This gentleman having now accused me of resorting to frivolous insinuations, I beg the favour of a *final* explanation, garnished with some additional facts, which are quite as difficult of refutation as those already placed before your readers.

Without descanting on Mr. Hayward's native modesty, I will proceed briefly to consider the two leading points of his letter—viz., the picking holes in other designs, and the non-sending of the pamphlet for distribution.

On the first point I ask, will Mr. Hayward forward a copy of his pamphlet and remarks, &c., to the Council of the Institute, for their opinion on the professional nature of the proceeding? and on the second point, will he explain before the said Council the meaning of the following extract therefrom?

Copy from a letter addressed to Charles C. Whiteford, Esq., Town Clerk, Plymouth, "to be read at the next meeting of the Town Council, or when any decision is proposed to be come to."

Extract.—"N.B.—With this letter I beg to forward a copy of a more extended statement as to my design, for distribution to members of the Corporation and others, but I have no objection whatever to this also being published if required.—(Signed) C. F. H."

Will Mr. Hayward also explain at whose instigation, and through whose instrumentality, a lithographed copy of the plans that now accompany his printed statement was surreptitiously affixed to a set of drawings exhibited at the Royal Hotel, under the motto "Ich Dien," and this only a few days previously to Mr. Waterhouse's arrival in Plymouth?

I beg to assure him that one of his "sincerely respected" friends in a conversation on the subject justified the act, "saw no harm in it," and further said, that the additional drawings were sent as the originals were not considered sufficiently explanatory. I quote his own words, and challenge contradiction.

Probably enough has now been written to prove that my assertion is neither unfounded nor untrue; but failing its being thoroughly convincing, I think Mr. Hayward's admission that his printed statement or a copy was in the hands of the Editor of every Plymouth paper at the earliest moment to prevent any idea of private influence (of which no notice was taken) illustrates that his efforts to obtain priority were even more strenuous than those I attributed to him, and the present attempt at an explanation forms a capital joke that will not easily be forgotten.

I enclose printed copy of a letter addressed to the Mayor and Town Council of Plymouth, for the accuracy of which I can vouch, and its insertion will perhaps be a balm to the feelings of those who have been unsuccessful in the race for fame,—I am, &c., W. H. Reid, Architect.

22, Courtenay-street, Plymouth,
March 2, 1870.

[This controversy, as far as our columns are concerned, is now closed.—Ed. B. N.]

THE DICTIONARY OF ARCHITECTURE.

Sir,—In reply to the inquiry of "Vitruvius," in your number of yesterday, permit me to state that to all new subscribers to this work who may pay £15 16s. in one amount, the whole of the work which has been published up to the present time—viz., to the end of the letter L, will be at once supplied, and the continuation will be delivered as it appears.

The fifteen guineas may be paid by instalments of not less than three guineas each, and at intervals not exceeding twelve months, but so that the last payment may not be later than February, 1874; and for each instalment so paid an equivalent portion of the dictionary already published will be supplied, and on completing the full amount of the subscription such subscriber will be entitled to receive the continuation, in like manner to those who may have paid the amount in one sum.

Intending subscribers may be assured that every care will be taken by the Committee so to conduct the production of the remainder of the Dictionary as to secure for it the like commendation and recognition that has been bestowed on the preceding portion.

With the next part issued title pages and tables of the plates will be published, which, with preceding titles, &c.

will enable subscribers to bind the text and plates now issued in seven volumes of moderate bulk.

I may add that, not more than fifty copies now remain available for new subscribers, and it is certain that when these are appropriated the market value of the book will be much enhanced; all, therefore, who wish to acquire it should not longer delay sending in their names. I shall be happy to reply to any inquiries which may be addressed to me.—I am &c.,

ARTHUR CATES, Hon. Sec.

7A, Whitehall Yard, S.W., Feb. 26.

Intercommunication.

QUESTIONS.

[1789.]—MAPPING.—Could any of the readers of THE BUILDING NEWS inform me where I could procure a book on mapping, ornamental printing, &c., and the price?—DRAUGHTSMAN.

[1790.]—ROOF OF NEW MIDLAND STATION.—I have heard it argued that the roof of the new Midland Railway station exerts no lateral thrust whatever on the flank walls of that building, and should feel greatly obliged to anyone who will kindly answer this question.—STUDENT.

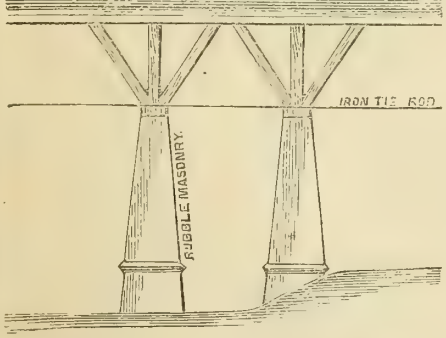
[1791.]—EMPLOYMENT ABROAD.—"An Assistant," who has been some time out of employ, and does not see much chance of getting any, would take it as a great act of kindness if some of your numerous correspondents will kindly answer the following. What prospect would a fair draughtsman and general assistant have of obtaining employment in either New Zealand or Australia; what salary would he be likely to get; and is it possible to get an appointment before starting?—A WOULD-BE EMIGRANT.

[1792.]—MOUNTING LARGE MAPS.—I have to mount a set of ordnance maps to form a plan 11ft. by 7ft. 6in. The widest cloth I can get is 40in., and a seam sewn would be objectionable, as liable to form a ridge; besides, the maps, not yet damped, don't quite agree. How must I manage? Will somebody who knows please take the trouble to reply early, and oblige?—R. N. O.

[1793.]—DISTRAINT FOR RENT.—Can any of your correspondents tell me what is the law with regard to lodger's chattels? It is the generally conceived notion that the lodger's goods can be seized with the occupier's. Is not the law altered, or undergone some modification?—READE R.

REPLIES.

[1770.]—FRAMING OF PARTITIONS.—It would appear by "F." and "F. S's" replies given in your last week's issue that they are, with myself, unanimous with "Foreman's" idea of constructing a partition for the carrying of a roof truss. My sketch (given the week before last) showing a king-post and strut inverted, is, according to my views, the most practical method for the supporting a superincumbent weight if properly tenoned and bolted together. I would like to be informed what "spreading" would take place? I do not approve of "T. S. G's" idea of dispensing with the king-post and using diagonal whole staunchcons from girder to top sill of partition: cutting up of timber there may be with struts, but surely are they not capable of supporting threefold the weight of the diagonal pieces? I quite concur with "T. S. S." that the girder should not substitute a ceiling joist, for very obvious reasons. The position of girder should be carefully supervised by the clerk of works or the foreman during the erection of the building. As the "Clerk of Works" has yet to learn the principle and the safety of the



inverted truss, I herewith give a rough pen sketch of the plan on which one of our greatest engineers constructed his viaducts on the Cornwall Railway some 12 years since, which of all other places demanded work sound in principle and execution to support the daily traffic of the waggon loads of ore and China clay that passes over them, and, therefore, if an inverted truss has been so successfully used in railway viaducts. I cannot see the objection to working on a similar principle in private works. It is true flitch girders and trusses may be a serious deviation from the architect's specification, but this is not the question at issue; it is the performing of work on a proper principle to stand for all time, or built to sell.—CLERK OF WORKS, R.E.D.

[1774.]—CIRCULAR RAIN WATER TANK.—I am much obliged to "W. R. A." for his solution of my problem in last week's "Intercommunication" column. The case of measurement was one of dispute between the men who did the excavating for the tank, and myself; they contending that by their method of admeasurement (practical enough for themselves no doubt) of multiplying half the circumference of the tank by half its diameter, by 30ft. as depth, would give the contents near enough. I proved this method to be a very incorrect one, hence my appeal to your journal. I cannot, however, but express my regret that your readers should from time to time be subjected to the obnoxious and insinuating sarcasms—the language of which is very poor—of your correspondent "W. R. A.", after simply asking aid through your columns.—SANDYSARMS.

[1774.]—CIRCULAR RAIN WATER TANK.—Multiply half the circumference by half the diameter, and the result multiplied by the depth will yield the cubical contents.—F.

[1774.]—CIRCULAR RAIN WATER TANK.—I am sorry that through an oversight my answer to the above in your last should have been incorrect. The correct result is that supplied by "W. R. A." The rule, you may see, is the same in both answers.—W. J. C.

[1775.]—IRON ROOFS.—There are some excellent descriptions of iron roofs in Mr. Fairbairn's "Useful Information for Engineers," third series. Also in a work by Mr. Dempsey, in Weale's Series.—A. R.

[1776.]—CEMENT WITH MORTAR.—Bearing in mind that in the manufacture of cement the greatest care is taken to ensure the proper proportions of the different ingredients, of which lime is one, there is manifestly no advantage to be gained in mixing it with a large additional quantity. It is possible that the cement might improve the mortar, but the latter would certainly not improve the former. It is the practice in wet situations to add a barrel or so of Portland cement to ordinary concrete, but this is to obtain its setting properties, which would not be required in the case of half-brick walls.—BETA.

[1778.]—CIVIL ENGINEER.—Your correspondent has mooted a question which it is impossible to answer. It is the disgrace of the profession that there is no absolute, *bona fide* criterion of the fact—what is a C.E.? Anyone may append those two letters to his name, and there are none to question his right to do so. There are no legal or valid means for distinguishing the base metal from the true coin, the impostor from the genuine practitioner. Many plans have been put forward at various times for removing this anomalous state of affairs, but nothing has been ever effected. It has been suggested that "The Institute of Civil Engineers" should move in the matter, but in reality the members of that body care nothing about the status of the profession, nor anything else except their own interests.—ANOTHER C.E.

[1784.]—CLEANSING VARNISHED SEATS.—The best material for removing dirt and grease from paint or varnished deal is the cleansing powder sold by the London Sanitary Company, 6, Liverpool-street, E.C. I have used it for several years.—R. W.

[1786.]—VOLUME OF WATER.—The effect of drawing off 20,000 gallons per day from a reservoir 200ft. × 200ft. × 15ft. would be that it would be emptied in a month's time, and if 1000 gallons per day were at the same time coming in, the supply would last a day or two longer. This is a mere matter of arithmetic, and if that had been all that is involved in the question it had hardly needed a reply, there being 6¼ (or more correctly 6·23) gallons in every cubic foot; but another effect would take place, providing the reservoir be not covered over, which, if a domestic supply is to be drawn from it, is of great importance. In uncovered reservoirs of less than 14 or 15 feet in depth, vegetation is rapidly promoted, and when that dies animalculæ are formed. So that in this reservoir, after the first two or three days' draught upon it, vegetation would commence and go on increasingly from day to day, and the water would be quite unfit for domestic consumption. If the reservoir be covered this objection will be done away with.—WATERWORKS.

[1788.]—LONDON UNIVERSITY.—There are two colleges in London which provide courses on Architecture—University and King's. If "Double You Bee" will send for a prospectus of the Architectural course at University College, Gower-street, he will obtain all the information he requires.—W. J. C.

LAND AND BUILDING SOCIETIES.

TEMPERANCE PERMANENT LAND AND BUILDING SOCIETY.—The sixteenth annual meeting of the members of this society took place at the Terminus Hotel, Cannon-street, on Wednesday week. The attendance was very large. Mr. Phillips, the secretary, read the report, which showed the following results:—The total receipts of the year amounted to £431,000. The shares issued during the year numbered 16,433. Nearly £143,000 were received for subscriptions on investing shares, being nearly £18,000 in excess of the preceding year. The re-payments of advances amounted to £119,400, being less than the preceding year, many borrowers not having redeemed their mortgages, by extra payments, as rapidly as in more prosperous years. The subscriptions withdrawn by members amounted to £53,000, leaving at their credit more than £534,000. Nearly £47,000 were received on deposit at 4 per cent. interest, and £50,700 were re-paid to depositors, leaving at their credit more than £132,000. £42,500 were received for interest and premiums on the investments of the society. The sums advanced on houses amounted to £272,000. The amount remaining out on houses and land, and secured by mortgage, was £698,000, the total sum advanced on this description of security since the commencement of the society being more than £1,370,000, the assets of the society have been increased by £107,000, and amount nearly to £800,000. During a portion of the year the rate of premium for advances was lower than at any time previously. The directors have been able to apportion profit to investing shareholders at the same rate as preceding years, viz., 7½ per cent. per annum on the subscriptions at the credit of the shares in force. They have also apportioned profit on uncompleted shares withdrawn during the year (in addition to the profit paid on withdrawal), at the rate of 4 per cent. per annum for the portion of the year expired prior to the receipt of the notice of withdrawal. After providing for charges of management, &c., the balance of the profit has been carried to the reserved or contingent fund account which now stands at £68,286.

SOVEREIGN PERMANENT BENEFIT BUILDING SOCIETY.—The second annual meeting of the members of this society was held at the offices, Moorgate-street, on Wednesday week. The report, which was adopted, stated that the share income of the year was £5811 9s. 6d., as compared with £3553 14s. 4d., for 1868. The amount advanced was £2373 3s. The loans and deposits were reduced by £3661 8s. 5d. The repayment subscriptions secured by existing mortgages amounted to £12,845 16s. 11d., and the profit included therein and receivable in future years has increased to £5032 2s. 3d. The gross profit for the year was £759 15s. 11d, and the dividends payable, including £166 15s. 3d. 6 per cent. on paid-up shares for the last half-year, amounted to £485 14s. 6d. The investing members' balances reached a total of £6544 17s. 9d., having increased from £2910 18s. 10d. in 1868.

Our Office Table.

SIR JOSEPH WHITWORTH ON STREET TRAMWAYS AND ROAD-MAKING.—The use of horse tramways is being urgently pressed forward, and a large outlay is contemplated. In Sir Joseph Whitworth's opinion, however, they are not suited to the present times, and mechanical engineers have a right to enter their protest, considering the many obstructions there have been for many years past to the employment of road locomotives. If toll gates were abolished, and each county had an organised staff for making and keeping the roads in good order, using the steam roller, steam sweeping machine, and other necessary appliances, where there is a large traffic, mechanical engineers would then, Sir Joseph has no doubt, soon produce a small light locomotive that would do its work quietly and most effectively; at the same time, pedestrians and those who ride and drive would have the great enjoyment of good and clean roads, instead of the present badly paved and rough macadam roads. The broken stones of the latter are now left for the horses' feet and narrow wheels to consolidate in a way which it is quite distressing to see. The consumption of fuel per horse power is now so small that road locomotives could be employed at far less expense than the over-worked and ill-conditioned horses we now see, while pedestrians and those who keep animals for pleasure would have good roads, and many gentlemen, no doubt, would have their well-made locomotives. Under any circumstances, good clean roads are the most profitable when everything is taken into account; but unfortunately those who make and repair them generally consider only one side of the question.

RESCINDING A CONTRACT.—SEFTON PARK, LIVERPOOL.—A special meeting of the Liverpool Town Council was held on Monday week to consider a resolution of the Improvement Committee consequent upon the alleged bankruptcy or stoppage of Mr. Samuel Campbell, contractor for the Sefton Park works. From the minutes of the meeting of the Improvement Committee on the 16th February, it appeared that a certificate had been submitted from Messrs. André and Hornblower, architects and designers of the park, setting forth that, according to their judgment, "The contractor has not exercised, and is not exercising, such due diligence, and is not making such due progress, as would or will enable the works contracted to be executed on or before 1st July to be completed within the time." Upon this it was resolved by the committee "That notice be immediately given by the Town Clerk to Mr. Samuel Campbell, under the eleventh clause of the contract between him and the corporation for the execution of works, Sefton Park, dated 22nd June, 1868, to determine the contract, and that the Town Clerk do employ a suitable person to enter upon and take possession, on behalf of the corporation, of the works and materials on the ground, and all the plant, tools, and material of the contractor." The resolution, after some discussion, was adopted by the town council. According to a report in the *Liverpool Mail*, one or two of the members of the council alleged that the contractor's difficulties were, in a great measure, due to his unjust treatment by the architects.

PROPOSED NEW STREET FROM WEST TO NORTH EAST.—At the next meeting of the Holborn Board of Works, the question of co-operating with the Clerkenwell and St. Luke's authorities in urging upon the Metropolitan Board of Works the necessity of making a new approach from the west to the north-east of London, by way of Wilderness-row, St. John's-square, Liquorpond-street, King's-road, Theobalds-road, and Hart-street, Bloomsbury, will be

considered. By widening Wilderness-row, and pulling down a few houses so as to continue it across St. John-street, St. John's-square, and Clerkenwell-green, and by slightly improving the eastern approach to Liquorpond-street, and the western approach to Theobald's-road, a very valuable and continuous line of thoroughfare would be secured from Shoreditch Church to New Oxford-street.

Improvement in St. Paul's Churchyard.—At a meeting of the City Commissioners of Sewers on Tuesday last, it was determined to lay into the public way about 6500ft. of ground at the west end of St. Paul's Cathedral, at a cost of £20,000, the Metropolitan Board of Works being asked to contribute towards the cost.

Institution of Surveyors.—The following candidates were balloted for and declared duly elected at the last meeting, viz. as members,—John Carter Clayden, Barnet, Herts, Edmund Rushworth, 22, Saville-row, W. As associate,—Chas. William Thompson, 17, Parliament-street, S.W.

Proposed New Approach to Smithfield Market.—On Friday afternoon last a public meeting was held at the Metropolitan Meat Market, in support of a proposal to construct a short length of street from the extreme end of Charterhouse-street, at the north-east corner of the Market, to Goswell-road, immediately opposite Old-street, St. Luke's. This would place the Meat Market, as well as Holborn and Oxford-street, in direct communication with St. Luke's, Hoxton, Shoreditch, and the Hackney and Kingsland roads. The estimated cost of the new street, which would be 400 yards in length, is £30,000. A deputation was appointed to wait upon the Metropolitan Board of Works to request the assistance of that body in carrying out the improvement.

The Wallace Monument as a Beershop.—A correspondent of the *North British Daily Mail* writes angrily protesting against a recent decision of the Stirling Town Council granting a license for the sale of beer on Sundays at the monument. He quotes a choice paragraph from the speech of a Scotch minister at a recent public meeting. "What would the ancient Greeks have thought of a memorial erected at the Pass of Thermopylæ to Leonidas and his 300 Spartans, and plastered over the front, 'Alloa Ale?'" We suggest, as a reply to the rev. gentleman's query, that the sentiments of objectors and approvers would probably have been identical, namely that "they had come to a very *pretty pass* indeed." Seriously, however, the thirsty Scotchmen of Stirling might surely have found some other place for a beershop, without turning the Wallace monument into a drinking fountain. Our Glasgow correspondent also refers to this.

Railway Passengers' Assurance Company.—The twenty-first annual meeting took place on Wednesday, Mr. J. Clay, M.P., in the chair. The directors report the premium income of the year at £118,403 10s 7d. as against £113,657 3s. 4d. in 1868; the receipts from investments, at £112,360 9s. 5d., against £117,085 18s. 1d. in 1868. The compensation paid during the year amounted to £65,194 3s. 6d., or 55·06 per cent. on the premiums received, the rate for the previous year having been 54·72 per cent. The claims included 31 cases of fatal and 3406 other accidents. The bonus recommended is 16s. a share, in addition to the usual interest at the rate of 5 per cent. The paid-up capital, after payment of dividend, being now increased to £50,000, and the reserve to a similar sum, and it being considered that £100,000 invested funds afford an ample guarantee to the public, the directors recommend that all policy-holders who have paid continuously five yearly premiums be allowed a bonus of 10 per cent. on the amount of their future annual premiums so long as the profits will admit. The report was adopted unanimously. The appointment of Mr. Eade and the Hon. E. Ashley as directors, in the room of Messrs. Harrison and Penlington, deceased, was confirmed; and the directors retiring by rotation, and two of the retiring auditors, were re-elected. £100 was voted to Mr. Scrutton, in acknowledgment of his long services as auditor.

Chips.

In the Court of Exchequer, on Saturday, Sir Robert Peel obtained £5355 damages from the Metropolitan Board of Works for injury done to his residence at Whitehall Gardens by the Thames Embankment works.

The heating apparatus at S. James's Church, Devonport, getting out of order on Sunday week, the sulphurous fumes so affected the congregation that many had to be carried out, and the services could not be proceeded with.

Wem parish church has just been fitted with hot water heating apparatus by Messrs. Evan and Morris, plumbers, &c., of Shrewsbury, at a cost of £125.

The new market hall at Dolgelley is rapidly approaching completion, and the contractors expect to have it out of their hands by July 1.

The Versailles Gallery of Sculpture has just received marble busts of the chemist Chaptal; the Orientalist, Champollion; Mollien, Augustin Thierry, François Arago, and Georges Cuvier. They have been executed for the Government by various known sculptors.

A discovery has been made in the kitchen of the Château de Rochechouart, in Haute Vienne, of some mural paintings of the sixteenth century. The most important, the colours of which are still bright, represents an archery party. There are eleven figures in the composition; one being that of Fortune, who, with her foot upon her wheel, seems to preside over the scene.

The proprietors of the "North British Daily Mail" have offered to subscribe £500 towards the institution of a society having for its object the provision of cheap, healthy, and decent dwellings for the working classes of Glasgow.

The Middlesex magistrates have resolved upon enlarging the Clerkenwell House of Detention.

Deptford dockyard has been purchased by Mr. H. E. Marsh, auctioneer, of Cannon-street, on behalf of Mr. Austin, for a little less than £100,000. Considering the extent of the yard, which is more than 22 acres, this is not a large sum, being about £4500 per acre, and the price, we are informed, includes the slips, storehouses, cranes, and over thirty houses.

Sir Shafto Adair has presented to the inhabitants of Ballymena a "people's park," extending over 55 acres. Sir Shafto further proposes to enclose and ornament the park at an estimated cost of £1500.

A portion of the new Roman Catholic Church of the Sacred Heart, Camberwell, was opened on the 16th ult.

Mr. James Holland, a well known member of the Society of Painters in Water Colours, died last week at his residence in Osnaburgh-street.

The erection of a new Baptist chapel is talked of at Clapham.

The Phœnix Gas Company has resolved to reduce the price of the gas supplied from its works at Bankside by threepence per thousand feet. This is the third reduction since the passing of the Act of 1860.

The Bible Christian chapel in the Waterloo-road has been re-opened, after restoration from the effects of the late fire.

The Newington vestry has decided to petition Parliament against the Pimlico, Peckham, and Greenwich Street Tramways (Extension) Bill.

One of Messrs. Aveling and Porter's steam road rollers has recently been employed in consolidating the macadam of the Blackfriars-road.

An amalgamated committee of representatives of each of the vestries of the metropolis for the purpose of watching Parliamentary action on any matters connected with metropolitan affairs has been formed. The question under immediate consideration is that of street tramways.

The street tramways now in course of construction in Lambeth are estimated to cost about £4000 per mile.

A company is in course of formation having for its object the erection of a lecture and concert hall in Battersea, in lieu of the old Lammas hall.

A correspondent writes to correct the statement that "no site can be obtained for a proposed new theatre," as there are several good sites suitable for the erection.

MEETINGS FOR THE ENSUING WEEK.

Monday.—Institution of Surveyors. 8.
" Entomological Society. 7.
Tuesday.—Institution of Civil Engineers. "Description of the Line and Works of the San Paulo Railway, Brazil." M. D. M. Fox, M. Inst. C.E.
" Royal Institution. "On Plant Life as Contrasted with that of Animals." By Dr. Masters, F.L.S. 3.
Wednesday.—Society of Arts. "On Tramways in Streets." By W. Bridges Adams. Esq. 8.
" Geological Society. 8.
Thursday.—Royal Institution. "On the Chemistry of Vegetable Products." By Professor Odling. 3.
" Linnean Society. 8.
" Society of Antiquaries. 8.30.
" Society for the Encouragement of the Fine Arts. Second Conversazione of the Season, at the Gallery of the Society of Female Artists, 9, Conduit-street, W.
Friday.—Architectural Association. "Domestic Architecture during the Reign of Queen Anne." By R. Almond, Esq. 7.30.
" Royal Institution. "On Chance." By Prof. Sylvester, M.A., L.L.D., F.R.S. 9.
Saturday.—Royal Institution. "An Introduction to the Science of Religion." By Prof. Max Muller, M.A., L.L.D. 3.

Trade News.

WAGES MOVEMENT.

Glasgow.—Strike of House-Carpenters and Joiners.—At a large meeting of the house-carpenters and joiners of Glasgow, held on Saturday night, it was reported that twenty-two of the employers in the town had agreed to the demand of the men for a reduction of the working hours from ten to nine hours per day, and also to grant an advance of wages from 6d. to 6½d. per hour. Several of the largest employers refused to accede to these terms. About six weeks ago the Glasgow and Partick Branch of the Associated Carpenters and Joiners of Scotland applied to the General Society to sanction their demanding from the masters a reduction of working time to nine hours, and an increase of wages from 6d. to 6½d. per hour. At that time the society refused to sanction them in going in for the double demand, though there was a disposition shown to support them in asking for a reduction in the hours of labour. Since then a second application from the Glasgow and Partick Branch was made to the General Association, and the matter having been submitted to the branches of the society throughout the country, the result was that by a vote of 791 to 41 they agreed to sanction a strike for the enforcement of the double demand. The *Scotsman* states that a large number of the Glasgow joiners employed in those workshops the proprietors of which refused to accede to their demand, left work on Monday night with the intention of not resuming.

TENDERS.

Abingdon.—For proposed alterations and additions to a house, Abingdon, for Pauline Martin, Esq. Mr. Edwin Dolby, architect.—

Townsend	£255 0 0
King	255 0 0
Drew	249 10 0
Williams	235 0 0
Bryan	225 0 0
Davis	221 7 3

Berks.—For new grammar school, Reading, Berks. Mr. Alfred Waterhouse, architect:—

Cleasy	24,906
Gregory	24,878
Doverwood and Co.	23,798
Woodroug	23,768
Brass	23,495
Matthews	23,212
Hibbard	22,959
Pollard	22,384
Wheeler	22,292
Bays and Rammage	22,000
Hains and Son	21,976
Cowland	21,840
Simpson	21,765
Colls and Son	21,746
Jackson and Shaw	21,746
Mansfield and Price	21,555
Macey	21,384
Gibson, Bros.	21,178
Horseman	21,486
Walton, Bros.	21,427
Perry and Co.	20,915
Nightingale	20,770
Woodbridge	20,730
Blackmore	20,574
Holland and Hannen	20,484
Jones	19,950
Kirk and Parry	19,905
Wright and Co.	19,895
Dimment	19,385
Bull and Son	18,900
Parnell and Son	18,707
Clarke	17,831

Brecon.—For Brecon County Gaol. Mr. Thos. F. Fillary, architect:—

Hamer Brothers	£10110 0 0
Williams and Bolton	9230 6 0
Watkins and Jenkins	8795 18 9
Welsh and Son	8700 0 0
Lovatt	8578 4 4
Jones and Johns	8478 0 0
Yates	7997 15 0
Williams Brothers	7850 0 0

Stone dressing reduced by two lowest.

Yates	£7473 11 0
Williams (accepted)	7198 0 0

Brighton.—For house and shop in North-road, Brighton, for Mr. W. Balcombe. Mr. John Hill, architect. Quantities supplied:—

Hall	£903 15
Marshall	800 0
Hampton	773 0

Bristol.—For finishing houses, St. Luke's-road, Bedminster, Bristol. W. Cloutman, surveyor, 4, Exchange Bristol:—

Contract No. 4.

Summons	£275 0 0
Stephens	263 12 0
Perkins and White	223 0 0
Howell	211 15 0
Millett	208 1 10
Hook	194 0 0
Leat (accepted)	190 0 0
Hobbs	189 0 0
Lloyd	185 0 0

Contract No. 5.

Perkins and White	£587 0 0
Millett	500 8 0
Lloyd	490 0 0
Hobbs	481 0 0
Howell	461 15 0
Stephens (accepted)	399 0 0
Harding	350 11 0

Cotehill.—For new rectory house at Cotehill, near Wetherall, Cumberland, for the Reverend John Howard. Messrs. Habershon and Brock, architects:—

Court (accepted)	£1417

THE BUILDING NEWS.

LONDON, FRIDAY, MARCH 11, 1870.

ARCHITECTS AND THEIR PUPILS.

ONE class of correspondents has of late had a good deal to say both in sorrow and in anger in reference to the vexed question of Architectural Education ; and we have given them every opportunity of saying it. We allude to pupils serving their articles in architect's offices. Many of these young gentlemen, fascinated by the "gentility" of the profession of an architect, rather than drawn with enthusiasm to an arduous vocation, demanding the well-sustained energies of a life of study, have induced their parents to article them at high premiums, with parchment indentures, binding their masters—we beg pardon, "principals,"—to "well and duly instruct the said H——— in the art, trade, and mystery of an architect and surveyor." They require to be so instructed. Paterfamilias, having paid down a round sum by way of consideration or premium, remains for three, four, or five years in fond expectation that young Hopeful is being so instructed ; that, at the expiration of his indentures (or "articles"), his son may be enabled to set up his brass plate, and to open an office with the best of his professional brethren. The youth begins his term, and, if inclined to be studious, betakes himself to reading : for he has entered, let us suppose, the office of "an architect in extensive practice, holding a public appointment ;" and for the first twelvemonths or so the young man finds there is nothing but reading for him. He has probably acquired, ere taking to architecture as a calling, little or no knowledge of drawing or of mensuration ; and, during this period of his noviciate, he cannot help feeling his own helplessness and inutility. He sees that, in plain parlance, his principal duty is to get out of the way, and not disturb the great Mr. B——, whom he is bound to, nor interfere with that gentleman's over-busy draughtsmen and clerks. So he reads on : for he is studious ; and the result of his reading is to inform him that the "art, trade, and mystery of an architect and surveyor," as he finds it set forth for him in, let us suppose, "Gwilt's Cyclopædia of Architecture," is an uncommonly tough subject for study. He begins to wonder how in the world B—— could have undertaken to teach him the whole of it for two hundred guineas. The whole of what ? Surely not all the Science, all the Art, and all the "Trade" that go to make up the ideal architect! Why, to realise the ideal, the mere sciences alone would suffice to wear out a man's life. An architect can, he sees at a glance, only hope to learn something of them all : something of mathematics, something of the many modes of projection, of statics, of chemistry, of optics, acoustics, pneumatics, and all the rest of it. These, albeit more or less needed by an architect, are not, by any means, architectural sciences *par excellence ;* they are nearly all taught in schools, all in universities, and not specially in architects' offices. And then, the Fine Art "Architecture," supposing it to be what it is not, really separable from Painting and Sculpture, how on earth is any one to absolutely teach it ? If it can, strictly speaking, be taught and learnt, what becomes of the classic saw, "*Poeta nascitur*," &c. ?

Our student emerges from the contemplation of the parchment romance, cunningly devised in the lawyer's office—for, what did the lawyer know about the "art, trade, and mystery" he was writing about, when he drew up young Hopeful's articles ? He awakes from the dream, to look around him and see how very few are the professional men, whom he will probably have to encounter in life, that know overmuch of the many sciences desirable, if not indispensable, for an architect, or that are imbued with an overweening ardour for the noble art, to which he has been "apprenticed"—yes, "apprenticed" by the lawyer. He meditates on the triple nature of the pursuit he has chosen ; on, in short, the three "lamps," he has to keep trimmed, that they may illumine him on his way through this hard world :—to wit, the Lamp of Science, the Lamp of Art, and the "Lamp of—Making a Living." "Ah," he exclaims,—"this last is the 'lamp' for me to———save out of my parchment indentures ! Why didn't B——— explain all this at first ? I might then have got my father to send me up to Oxford or Cambridge, and might there have usefully spent two or three years in acquiring some of the sciences I now perceive my want of. I might, too, have travelled, or have sketched and read, for a year or two ; and at the end of all, have gone to Mr. B———, and have paid him his premium for the privilege of seeing his large practice, and of acquiring that third 'lamp' of Making a Living, which is no where to be so soon, so easily, and so well acquired, as in an architect's office." He is tempted to write all this to THE BUILDING NEWS, but on second thoughts doesn't ; for he reflects that there is only one more year of his term to run. He asks himself, "What can be done in the time ?" Little of a certainty for Science and less for Art, but how about "Trade ?" "Well," argues our hero, "it will take the whole twelvemonth to acquire B———'s office lore of 'the Trade'—that is to say, of drains and concrete, and masonry and woodwork, and leadwork and slating, painting, glazing, and ironmongery ; his routine of preparing contract drawings, specifications, agreements, and certificates of professional fees and customs, and his architectural jurisprudence ; and really, when I come to look, not only at, but into B——— (who is after all a very good fellow), this office lore of his seems, as I may say, the very 'sack' of Sir John Falstaff to the 'bread, a halfpenny' of his (B———'s) Science and Art."

So ruminating, our hero takes courage and, ere his term expires, contrives by conversations with his principal (if he can get them) or by diving deep into office routine, to make himself during that last year "generally useful ;" and thus to pick up the whole modicum of tuition in the "art, trade, and mystery" of an architect, that since the building of the Tower of Babel, has ever been picked up by sheer use, and sheer use only, of a set of apprenticeship indentures. He contrives somehow to learn the "trade" of an architect's office ; and, if he becomes expert in it, and has "troops of friends" to push him on in the world, he haply finds his account at last in the two hundred guineas, expended in the venture.

Many architects are specially artists, many of them are specially scientific men. If they have pupils, it will go hard if the art architect does not often converse on art with his art-loving pupil ; while the scientific one will assuredly commune with the scientific pupil. But, whether a youth who has been articled to an architect shall ever shine in science or in art, will depend almost wholly upon himself. Many young men enter the profession altogether unconscious of the fact. It is of course always advantageous to enter a good office, and during the entire term of articles, to, if possible, have the benefit of seeing active practice ; which is better than all the theory in the world. But the student, even if he enter it with a really liberal education (and how few do this !) can never hope to shine in his arduous profession if he contents himself with that portion of the art, or of the sciences, which can simply be picked up in his master's office. An architect in active practice is the best person from whom to learn the "Trade" of an architect and surveyor,—for there is a "trade" to be learnt —and such an architect will have no time to deliver office lectures upo n the art (the Fine Art Architecture) or upon the cognate sciences. As to the sciences needed for an architect, and the art, without which he will be no true architect, the student can only acquire them by supplementary study out of office hours. Incidentally they may be topics of office-talk ; but they must not be regarded as office-lore.

All architects have not necessarily an extensive practice. Such men often know little of an architect's "trade." They may, nevertheless, be profoundedly skilled in their art, or in some few of the many sciences pertaining to its active pursuit. If these take pupils at all, they are bound in conscience to be always communicative of their knowledge (having time at their disposal), and with the generality of such architects, this does often happen. The pupils of such architects go elsewhere for office-practice—that is to say for "the Trade ;"—and often germinate thereafter into good, serviceable practitioners.

Our student readers who have had the run of our Correspondence columns, will feel some disappointment at the net result of these remarks on architects and their pupils ; but, if they inquire into the truth of them, and find them confirmed (as they will), no harm can have arisen from their perusal. Let them rest assured that no premium paid down will suffice to make a man an architect. How best to make an architect is a problem, from whose solution many famous architects, with sons to train as such, have recoiled. It is after all a very debatable question whether, taking into account the very many and very diverse qualifications to be secured for the aspirant, there is really any cheaper or quicker course to adopt than that of entering a good architect's office as an ordinary pupil ; always supposing the pupil's natural aptitude for a vocation so trying, his having had a really liberal education, with (we fear we must add) the profession of the national creed, the possession of a small private fortune, and troops of powerful friends, to afford him patronage. Sir William Chambers, for aught we know, may have had an eye to each and all of these last desiderata when discoursing on "the necessary qualifications for an accomplished architect," so very "many, and of difficult attainment." He was an excellent architect : but his great acquirements were not the result of a parchment indenture, and a premium paid down. He learnt something more than his "trade" ere he began to practise it. So did Wren ; and so did another excellent English architect, James Gibbs, who, after a University course and long academic training, deferred the commencement of his practice to a period of life, when our architects "of the period" fondly expect to have made a fortune.

MODERN STAINED GLASS IN GLASGOW CATHEDRAL.

APOLOGY for having hurt the feelings of your correspondent "St. Mungo" by my criticism on the Munich glass in Glasgow Cathedral would be fruitless as well as unprofitable. Considering the subject of discussion raised as too important to be smoothed over by the hollow courtesies affected by members of mutual admiration societies, I take up the gage of defiance he has thrown down to me, careless whether the result of the battle he invites me to engage in be my own discomfiture or the further laceration of his wounded sensibilities. It is to my mind a matter of congratulation that, though the admission of my opponent proves the correctness of my surmise that certain eels have become so accustomed to the process of being skinned as actually to rejoice and take pride in the operation, yet that the denudation of their integuments has left a wholesome rawness of the exposed nerves, which may possibly be pervious to argument.

It is not for me to speak of my own capa-

bilities and attainments, of which your correspondent desires to know more before he attaches the slightest importance to my strictures, but as they are not unknown to many of your readers, and I am willing to stake my professional reputation, such as it is, upon the correctness of my judgment in this matter, I think it would be but fair, and much to be desired, that "St. Mungo" and any other combatants in these lists should raise their visors and let spectators judge as to their credentials.

The opinions which I gave in my first article on this subject, if expressed forcibly, were deliberate, and the result of conviction, and I cannot retract a single expression.

"St. Mungo" invites me to say what are the defects I so much condemn, and from what causes they spring. First, then, I would say that there is an absolute incongruity between the character of the Munich glass and the architecture. The whole of the canopy work is but a parody of Gothic design. In this particular it is lamentably inferior to almost all English work, even in the least artistic, of which there is a fair knowledge displayed of the ancient method of treating these details in this material. Next, the colouring of all this portion of the windows in the Munich specimens, and also of the heraldic part beneath the pictures, and of the borders, which are continued on either side of them, is crude in the extreme. The backgrounds of the canopies mostly alternate with a hard violent cold blue and a staring scarlet, without any of the variety of tint in the various pieces of glass of which they are composed which is always to be found in ancient glass, and often attained in modern English.

The borders, which come in close juxtaposition to the pictures, are of loud zigzag and other patterns in strong red, yellow, and other colours, devoid of variety and delicacy. The heraldic lower portions are also violent and crude. "St. Mungo" asserts that my statement to this effect is simply an hallucination of my own. I ask, therefore, for the testimony of others as to this point.

To proceed to the pictures themselves which are set in this framework. These undoubtedly show in many cases powers of artistic design and colouring which one cannot but regret should be so misapplied. It is of this misapplication that I would principally speak. I wish neither to express approval nor condemnation of these pictures, taken by themselves, as I had neither time nor patience to sufficiently examine them. It struck me that they varied greatly in merit, and that many representations are to be found in them of figures dressed out in glaringly and discordantly-coloured garments, the absurdity of which would be apparent to any Glaswegian parent if he tried to conceive for an instant the fair members of his own family doffing the like; but I have also reminiscences of sufficiently soberly clad and well-drawn individuals, to which little exception could be taken, save that they ought not to be there at all, for the following reasons, to wit:—Firstly, that pictures of elaborately-shaded figures should be looked at and not through; shadows are in nature transparent, and lights opaque, but in transparencies this is necessarily reversed, and, therefore, such never have, nor ever can, become legitimate objects of art. Next, delicate naturalesque work is not suitable for decorative glass; the lovelier the painting the more it is out of place, for a head even by Raphael would necessarily be spoiled by being encircled by a hard and fast line of lead carried across the neck, and supplying a necklace neither ornamental nor part of the original design. I will not add other instances of the class of the Prodigal's pig, to which I referred in my last article, lest my opponent charge me with being needlessly flippant or profane; nevertheless, numbers of similar comical effects may be found in Glasgow Cathedral by those who wish to seek for them, and which cannot be called hallucinations of mine. Thirdly, these misplaced transparencies, these lead-murdered pictures, fit only to make yokels gape during an illumination, are utterly out of harmony with the grotesque framework with which they are surrounded, and which I have described above.

Such are the defects of these windows, and the causes from which they spring, according to my judgment, and now I ask their defenders, equally at leisure, to disprove my statements if they can.

"St. Mungo," however, asks me further to say "Wherein consists the difference of treatment in execution as shown in the Munich windows here from that displayed in the windows here by the Scotch, English, and foreign glass painters who have been employed in the decoration of our Cathedral, and let him select from these those of them he thinks superior to the Munich windows." In reply, I beg to say that I regret that the limited time I had at my disposal prevented my bestowing attention on others than those I came specially to see. All I can say is, that none others struck me as so offensive; the demerits of the rest—alas! they have many—are of a more modest description. In my previous article, which has given your correspondent such offence, I spoke my mind as to the general class of glass painting, under which most of the other specimens in Glasgow Cathedral may be ranked. As decorative work they are generally designed upon better principles, and fail for want of art power—and why? Because artists are not employed. If the public will go to glass manufacturers and buy windows as they would bottles, what better result can they expect? What buildings would they get if they went to builders' firms for them and sought to get the architecture in for the money?

But that I may not appear to condemn without being able to suggest a remedy, I would point to Llandaff Cathedral, where there are many windows by Messrs. Morris, Marshall, and Company, who are, as it is well known, a band of artists endeavouring to break the trammels of the system which has so long kept glass painting a mere branch of trade. Without pledging myself to indiscriminate praise of their works, they are in sufficient number, and of sufficient ability, in that cathedral, to prove that the revival of this art is quite within the power of English artists, who have a far better appreciation of the proprieties of Gothic design than any foreign ones. Let English artists be sought to execute English art, whether upon glass or walls—it may take them some time to master the requirements of a material new to them, and till then I should be glad to see more walls painted than windows spoilt—and let the English and Scotch public look at glass as at other paintings, and expect to find appropriate design, good drawing, no shading, and harmonious, but withal brilliant, colour; in fact, to open their eyes, and not fancy that windows are to be looked at with blinking ones; they will then soon view with appropriate disgust these Munich monstrosities.

If Scotchmen are so prone to travel, as "St. Mungo" alleges, let them look at equally ridiculous specimens of the same Munich glass as their own at Cologne Cathedral, where they can compare them with others in the aisle opposite by Albert Durer, and both with the still older and far finer ancient work in the windows of the choir. The last alone are right in treatment as glass, but the second named, although erroneous on principle, as all Renaissance glass painting is, in common with the similar modern school, yet beats the latter completely out of its own field, and is a fine thing in its way. Let them go on to Strasburg and feast their eyes with the colour of the ancient windows there, and then to Florence, if they would fain see good pictures on glass. Then, if they have eyes, and know how to use them, which many still greater travellers apparently have not, they will be less self-satisfied on their return home with their importations from the Continent, but will set themselves to make good use of the talent they have among themselves, and which only awaits their judicious patronage.

John P. Seddon.

P.S.—Since writing the above, I am informed, upon undoubted authority, that the Munich glass at Glasgow is open to other, and very practical, objections to those I have named, the colours in many windows having been discovered to be fading and scaling off.

OUR DOMESTIC FIREPLACES.*

More than five years ago the author of the book now before us issued a volume under a similar title. His purpose, as stated by himself, was to draw public attention to the subject he undertook. He thought, and reasonably, that the subject was one in which Englishmen are specially interested, and that investigation into and the record of the various attempts made at obtaining the greatest results from the combustion of fuel could not fail to interest the public, and might possibly lead the way to further improvement. Although successful as a book—two editions having been sold, and the book allowed to remain out of print for three years—the author's aim, from his own point of view, was not accomplished. He therefore determined, in issuing a third edition, to rewrite his book, and endeavour to produce a book more entertaining than the former, and having therefore a better chance of becoming popular and useful. In this we think he has succeeded, though whether his book will be the more acceptable to others not so interested in the subject as ourselves it is hard to say.

Mr. Edwards's book opens with a short historical account of the open fireplace. Carrying us back to the ages that immediately succeeded man's discovery of fire, or at least his *application* of a discovery which possibly long inspired reverence and dread, he introduces us to the Grecian tripod, which may, to all intents and purposes, be regarded as the first stove. Men had, by this time, become sufficiently familiarised with fire to admit it within a human habitation. The fuel used was wood, burned in the large bowl suspended within the upper rim of the tripod, the smoke being allowed to find its way from the apartment as it best might. No attempt at the construction of a chimney seems to have occurred to the Greeks: they contented themselves with avoiding as far as possible the unpleasant effect of burning fuel by various means. Sometimes the tripod was stationed in the open air until the fuel had become well ignited, and then carried into the room required to be warmed. Hard woods, which produced less smoke, in some cases a more fragrant smell than the common kinds, were held in great request, and when high honour to a guest was intended, or at the dictate of personal luxury, costly perfumes and spices were burned with the fuel, to disguise, as far as possible, its unpleasant odour. This of course was only practised by the wealthy. The poor had to submit entirely to the inconveniences of smoke. The brazier has probably remained in use longer than any other device for burning fuel. At the present day it is commonly employed in Naples and the south of Italy, and also in Spain. Even in England at the end of the last century the chamber of the House of Commons and other large areas were heated by charcoal or coke burned in open braziers. The constructive genius of the Roman people, which seems in all things to have guided rather to the accomplishment of useful as well as magnificent undertakings than, as in the case of the Greeks, to the consideration of mere æsthetic merit, led to con-

**Our Domestic Fireplaces.*—A new edition, re-written and enlarged, the additions completing the Author's contributions on the Domestic Use of Fuel, and on Ventilation. By Frederick Edwards, jun. London: Longmans, Green and Co.

siderable improvements. The hypocaustum, probably used first for the heating of baths, and then gradually introduced into the dwelling house, consisted of columns of arches about eighteen inches high, which supported a tile pavement, fastened by a fire-resisting cement. A fire made at one end below the level of the ground heated the pavement, the smoke and hot air passing around and between the columns before they escaped at some point of exit at the opposite extremity. The Romans appear either not to have understood or to have discarded the application of chimneys. Flues they undoubtedly did construct, but these were for the purpose of carrying the hot air from the hypocaustum into the chambers above it, and not for the escape of the smoke. A method of heating by air similar in general principles is also known to have been in use among the Chinese from a remote period.

In England, a pit or hole in the ground probably formed the fireplace at the time of the Norman invasion, which was protected after the fire was extinguished by the *couvre-feu*. To this pit probably succeeded the hearth slab, with a bank of clay or brick to partly enclose the fuel, and a couple of iron bars turned so as to be supported above the ground. The louvre arrangement, which excluded wind and rain, now began to be adopted for the escape of smoke, several openings being in some cases made in the roof. The removal of the fireplace to the end of the apartment, and the introduction of the chimney followed gradually, and the use of coal as fuel instead of wood, still more gradually. The new fuel was dear, and no appliance existed suitable for using it, until the introduction of a cage of iron, mentioned in Gage's "History of Hengrave," and even this—improvement though it may have been—was not sufficiently so to induce the increased adoption of coal. When, however, in the sixteenth century, popular prejudice had somewhat given way, and "the detestable sea coal" was graciously permitted to "spoil the complexions" of the City dames, improvements in the form of the fireplace speedily followed. Sir Hugh Platt in 1594, Sir John Winter (a cousin of the Marquis of Worcester) in 1658, and Prince Rupert in 1678, introduced methods not very dissimilar from contrivances which have in our own time sought adoption under the shadow of a patent. Prince Rupert's arrangement is remarkable from its exhibition of a principle that has since remained unapplied until within the last thirty years—viz., that of allowing the smoke to pass away by a narrow aperture behind the grate, instead of rising directly into the chimney. The smoke is effectually carried off by a sharp draught which is produced, and the fire burns well, and throws out considerable heat.

Other improvements followed at intervals, for which the reader can consult Mr. Edwards's book. We must pass on to 1745, when Dr. Franklin began his career of promulgating useful ideas which had been left in abeyance by the very slow moving people of those days. His first contrivance was the Pennsylvanian grate, with warm air-chambers at the back, which supplied fresh air from an external source to the apartment. Another was his "patent reversible" stove, as a modern inventor would assuredly have entitled it. This was for the purpose of warming two contiguous rooms on the same level with a single fire. It was intended for adoption where one room was used as a study, and the other as a bedroom. An iron plate was substituted for the brickwork dividing the rooms, and the fireplace so suspended in the middle of the plate that it could be swung round to face either room. This arrangement was of course only practicable in a few instances. Other suggestions of Dr. Franklin's are worthy of attention. At the close of the last century, "when the hob grate was commonly used and the Bath grate was adopted by those who did not mind avoiding smoke at the cost of a considerable consumption of coal," Count Rumford* began his labours in the improvement of the fireplace. American by birth, he was persuaded to remain in this country, where he took great interest in science, became a Fellow of the Royal Society, and assisted in establishing the Royal Institution. At a later period he was knighted, and afterwards entered the service of the Elector of Bavaria, returning, however, still later to this country. His improvements and those of others who succeeded him are all recorded by Mr. Edwards, and were referred to at some length in our review of the first edition of his book.†

The consideration of the improvements which may still be effected in our fireplaces, which is the subject of the third chapter of the book, is of the most importance. Inventors may take it for granted that the open fireplace—so natural to our English habits—will under some form or other continue in vogue. Hence, among other means for better economising its heat, attention may be most profitably directed towards inprovement in the *form* of the grate. We agree with Mr. Edwards that, unquestionably, the best is that which presents the largest amount of radiating surface to the room. In this particular the old grates were especially defective. There is, however, no need of a monotonous repetition of square forms. Other forms may, and should, be developed to the fullest extent of which they are capable. The next most important point for consideration is the material for the construction of grates. The interior portions should be undoubtedly of fire-brick, fire-lump, or fire-stone, and on no account of iron. For the external portions Mr. Edwards advocates the use of tiles, on the very good grounds of their cleanliness and capability of decoration. The form and length of the firebars are also of considerable moment. The canted or curved form is perhaps the best; they should be about 6in. to 8in. above the hearth, and, for ordinary apartments, about 9in. in breadth. The escape of the warm air into the chimney must be specially guarded against. This can be effected easily by constructing the usual large open space immediately joining the fireplace, and by the use of registers. The proper supply of air to the room in immediate proximity to the fireplace, instead of from the doors and windows, is so universally neglected as to be almost in danger of being totally forgotten. Yet none acquainted with the subject will deny the importance and necessity of preventing the draughts from the doors and windows which now travel across the room when the air rushes towards the chimney. These evils may be easily obviated by the formation of air-channels from outside walls to our fireplaces, so that fresh air may reach them without traversing the room.

Other methods of keeping our houses warm, such as double glazing windows, utilising the waste heat which escapes by the chimney, and the consumption of smoke, are treated at considerable length, and a chapter is added on pedestal stoves and other methods of warming our halls and staircases.

The book is illustrated with 149 figures of the various kinds of stoves, of which the greater number appear for the first time. It is a complete and masterly contribution to the elucidation of further improvements in the industry on which it treats, and we shall be very much surprised if the public allow this to remain, what Mr. Edwards, with too much modesty, calls it, "the completion of his labours."

THE REPORT OF THE RIVERS' POLLUTION COMMISSION.

THE Royal Commission for Inquiring into the Pollution of Rivers in England and Scotland was appointed, in April, 8168, to supersede a former Commission issued in 1865. Sir William Thomas Denison, and Messrs. E. Frankland and J. C. Morton, who form the Commission, have recently presented their first report, dealing mainly with the condition of the Mersey and Ribble basins. It will be remembered that reports were presented by the former Commission on the rivers Thames, Lee, Aire, and Calder.

That now before us is arranged under two heads, the first describing the district visited by the Commission, and relating the various experiments made in the purification of water contaminated by sewage or manufacturing refuse, and the second dealing in detail with the whole subject of the water supply within the Mersey and Ribble basins.

With regard to the pollution of water, all who have given evidence before the Commission agree that the rivers are in a far worse condition than formerly, and this fact ceases to cause surprise when it is remembered that between 1831 and 1861 the population of the area drained by these rivers and their tributaries has increased from 1,578,370 to 2,796,964, while the increased adoption of manufacturing processes requiring the aid of pure water can hardly be estimated. Sewage and manufacturing refuse are the two great enemies to the purity of rivers. The mansion, the cottage, and the mill contribute, though not in equal proportion, to the nuisance, and the river channels thus become the recipients of every kind of waste material. The responsibility for this state of things, though varied in degree, is general. The landowner, who bitterly complains of the neighbouring corporation or millowner, is to a certain extent just as guilty as they. In fact, as the Commissioners observe, while all complain of the effect of the habitual carelessness upon their own comfort and convenience, all are equally indifferent to the comfort and convenience of others.

We cannot follow the Commissioners into their detailed description of the influences to which the rivers are subjected, or into their investigation of the various remedies suggested for the evils described; our space only allows us to glance at their conclusions and the measures they recommend for improving the present bad condition of the area examined. With regard to sewage, irrigation is recommended as the best—in fact, the only, safe and trustworthy remedy for that proportion of pollution contributed by towns. Manufactures, however, are in a somewhat different position. Some polluting materials—such as those from calico-print and silk manufactories—cannot be used in agriculture with advantage, and those who use such will have to resort to subsidence or filtration. These processes have been already found by many manufacturers not only practicable but profitable. Whatever is done, however, whether by towns or manufacturers, with their sewage or refuse, the Commissioners unanimously recommend that its presence in the rivers should henceforth be peremptorily forbidden. The constitution of some authority is of course necessary for the carrying out of this general principle, and for the prevention and punishment of all offences against the purity of rivers. On this point the Commissioners have not been able to agree. Sir William Denison is in favour of a purely local authority. As the offence committed must necessarily be local, he would have the preventive or corrective authority also close at hand, and this he would accomplish by adhering to existing divisions. Accepting the parish as the unit, and holding the parish officers responsible for the state of the rivers and streams passing through or by it, he could group the parishes collectively into local boards, also responsible for the condition of the area represented. The members of these bodies should be resident, unpaid, and responsible to the general government.

Dr. Frankland and Mr. J. C. Morton are of opinion that local boards would be incompetent to act as desired, without the guidance

* A portrait of Count Rumford is given with Mr. Edwards's book.

† See BUILDING NEWS, August 5, 1864.

and assistance of some central authority. They, therefore, recommend the constitution of a central board, to be composed of not more than three persons, who shall be duly qualified to deal with the pollution of water and water supply, and shall have jurisdiction over all the streams and rivers in England. To this central board they would also entrust the investigation of all schemes for water supply, and all proposals in public works connected with river conservancy, and the reporting thereon to the Home Secretary.

To guard the manufacturer from arbitrary interference on the part of the River Conservancy Board, however constituted, and yet to ensure a due performance of the duties for which it is to exist, the Commissioners have united in framing a standard of purity below which no liquid shall be admissible into rivers or streams :—

(*a.*) Any liquid containing, *in suspension*, more than 3 parts by weight of dry mineral matter, or 1 part by weight of dry organic matter in 100,000 parts by weight of the liquid.

(*b.*) Any liquid containing, *in solution*, more than 2 parts by weight of organic carbon, or ·3 part by weight of organic nitrogen in 100,000 parts by weight.

(*c.*) Any liquid which shall exhibit by daylight a distinct colour when a stratum of it 1in. deep is placed in a white porcelain or earthenware vessel.

(*d.*) Any liquid which contains, *in solution*, in 100,000 parts by weight, more than 2 parts by weight of any metal except calcium, magnesium, potassium, and sodium.

(*e.*) Any liquid which, in 100,000 parts by weight, contains, *whether in solution or suspension*, in chemical combination or otherwise, more than ·05 part by weight of metallic arsenic.

(*f.*) Any liquid which, after acidification with sulphuric acid, contains, in 100,000 parts by weight more than 1 part by weight of free chlorine.

(*g.*) Any liquid which contains, in 100,000 parts by weight, more than 1 part by weight of sulphur, in the condition either of sulphuretted hydrogen or of a soluble sulphuret.

(*h.*) Any liquid possessing an acidity greater than that which is produced by adding 2 parts by weight of real muriatic acid to 1000 parts by weight of distilled water.

(*i.*) Any liquid possessing an alkalinity greater than that produced by adding 1 part by weigh t of dry caustic soda to 1000 parts by weight of distilled water.

The Commissioners believe that as science progresses, improved methods of purifying polluted liquids will be discovered, and that eventually much higher standards may be adopted without injustice to the manufacturer, and with greater benefit to the general public.

ON ORNAMENTAL IRONWORK.

Fifth Lecture.

Mr. CAPES delivered his fifth lecture on this subject on Monday evening last, the attendance, as on former occasions, being large. The lecturer commenced by asserting that the application of the true principles of construction and ornament was as necessary in the smaller details of household furniture and fittings in ironwork as in the larger and more elaborate works designed for ecclesiastical and public edifices. The lecturer next pointed out that changes in modern habits required successive changes in articles of practical convenience, and what the designer in ornamental art had to do was to follow up all these changes in social wants in an intelligent and practical manner. Many of the specimens of domestic ironwork in the museum were designed for purposes which had now become obsolete, but, at the same time, if they were really good in themselves they deserved very careful study as showing the capabilities of the material. The proper understanding of the peculiar qualities of each material was the one grand lesson which modern art-workmen have to learn from the ancients, with whom the modern practice of shams and imitations was not at all in favour. Even in the most primitive times all the arts of construction were pre-eminently true and real. The huts and hovels of semi-savage races and the architectural works of the Greeks, Romans, or Mediævalists were alike constructed on principles suited to the capabilities of the materials employed. In the earliest ages the art of casting iron or other metals was not known, though the art of mixing two metals together was a very early discovery indeed. Of course the Stone Age was prior to this, as in that age the art of working metals was totally unknown. The invention of bronze was probably the very earliest discovery in working metals. The oldest reference we had to this discovery was in the 4th chapter of Genesis, where mention was made of one Tubal Cain as "a worker in brass and iron." The word which was here translated "brass" ought to be rendered "bronze," as in that age the mixing of zinc and copper to make brass was not known. It was sometimes supposed that the making of the molten calf in gold, as recorded in the Bible, was a proof that the casting of metals was understood at that early day. Mr. Capes, however, thought it in the highest degree improbable that any such process as casting was in use amongst a wandering tribe. The golden calf was probably a very small and ugly idol, hastily hammered into shape. Very possibly it was composed of thin plates of metal beaten out on to a wooden shape, as this method was known to the ancients. The lecturer next referred to one of the specimens exhibited on the screens, a fountain jet in the form of a lion's head. He did not commend that specimen as a model for a similar work, though it was marvellous in execution, for he thought there was something barbarous in making water-spouts out of the mouths of men and animals. He did not see the beauty of imitating in art what was repulsive in reality. He knew that the fashion of making heads, whether of animals or of men, pouring out water, sometimes with plain faces, sometimes with hideous contortions, was a custom very common indeed in the Gothic period, but it was said that these grotesques were the caricatures of the time ; that in a period prior to the invention of printing they answered the same purpose as the comic periodicals of to-day. Whether that was correct or not, it was difficult to understand how anybody could reproduce such things in the present time. Gurgoyles was the extremely ugly and appropriate name given to these grotesque water-spouts. But bad as was the taste evinced in the design of the fountain-jet referred to, it would at any rate bear comparison with the generality of iron spouts manufactured in the present day, which were simply abominations. Referring next to a collection of door-knockers shown on the screen, Mr. Capes said that he would not advise his audience to spend a very great deal of time in inventing new forms for knockers, for the day of knockers was past. They had long gone out in country places, and in the best town houses there are no knockers, only bells. Knockers, in fact, when once people had learnt to put up bells, were simply barbarous. The bell ought to have been substituted for the knocker many years ago, and it was only because we were so obstinately stupid that we stuck so long to so barbarous a makeshift as a knocker in a good house. But if the art workman in iron lost in the knocker one field for the employment of his skill, he could find an opening for great ingenuity in executing bell-handles and bell-pulls. At present these handles were designed as if in utter disregard of their ultimate use. They were sometimes too small, and sometimes so sharp as to run into the hand of the user, while again, in some cases, they were so big that no one less than a giant could get firm hold of them. All this resulted from the desire on the part of the designer to produce something new rather than something beautiful and convenient. But mistakes in practical designing were not confined to iron work. The whole contents of a costly modern drawing-room would attest this, to say nothing of such things as teapots, cups and saucers, &c., while in the matter of women's dress, an article only needed to be a novelty to meet with a ready sale. Mr. Capes greatly condemned this hankering after novelty on the part of buyers, and strongly insisted that mere novelty was not to be sought for irrespective of beauty or usefulness. Some fire-irons, such as were used with wood fires, were next referred to. Though too long, and in other respects unsuited for use with coal fires, they would still afford valuable hints to the designer of modern fire-irons. A pair of fire-dogs was also shown, and though, by reason of the change of fuel referred to, they are no longer a domestic requirement, Mr. Capes suggested that they would well repay study as models, to some extent, in designing the iron standards affixed at the ends of our modern fenders for supporting the fire-irons. These standards, as at present designed, were not only ugly, but were very often pulled from their sockets by the lifting of the irons. Passing on to the consideration of fenders, the lecturer referred to the comparatively modern custom of having movable iron fenders. In some buildings of the present day, said Mr. Capes, you may see fenders of stone or brick bedded into the floor of the room. These occurred in houses of which the architects were tremendously "Gothic" or revivalist, and determined to restore the fashions of four or five hundred years ago, whether good or bad. Many persons liked such fenders, but he preferred the movable iron fenders of the present time. But as to the vast number of iron fenders which were sold by ironmongers, they were very ugly indeed ; and showed no signs of any comprehension of the true principles of design. They toppled over very easily, and did not prevent the cinders from coming out into the room. They were not comfortable for putting one's feet upon ; which was a very serious fault in a fender. He should be very glad if some workmen would turn their attention to producing an ornamental wrought-iron fender. It was not necessary to have fine delicate work, for it would be little seen in such a position, and liable to get broken Such a fender should not have those awkward projections, characteristic of modern fenders, which were so well calculated to catch and tear. women's petticoats. A wrought-iron fender ought to be substantial and practical, and might even be made a work of fine art. Mr. Capes then went on to urge the value of wrought-iron work for modern lamps and gas-fittings, and remarked at some length on the immense field thereby presented to the art-worker in iron. Locks, keys, and hinges were next touched upon, the lecturer warmly praising the ancient practice of displaying the finely wrought and chased hinges of cabinets, &c.—a practice far more artistic than that evinced by nine-tenths of the upholstery of the present day, which was simply showy and glaring. The lecturer next referred to the practice of displaying hinges on church doors, &c., which the Gothic revival had introduced, saying that so far all was well, although he had no doubt that had the qualities of the material allowed it, these ornamental modern hinges would have been produced in many instances by casting rather than forging. In conclusion, Mr. Capes dwelt very forcibly upon the importance to the artisan of persevering practice in all branches of his work.

It may be stated that the works illustrating this and the preceding lectures are all to be seen in the collection at South Kensington. The sixth (and last) lecture will be delivered on Monday evening next.

NEW METHOD OF RAPIDLY DRYING TIMBER.

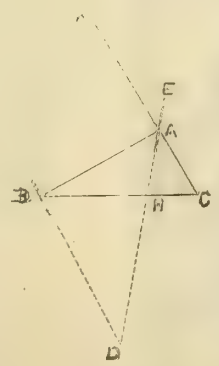
What is required to be done in order to effectually dry timber? In the first place it is indispensable that all the soluble particles within its pores be removed, or otherwise it is manifest that they will always constitute a cause of dampness and deterioration. They would, in fact, act as a sponge, and absorb and retain a considerable proportion of humidity. By the method to which we draw attention, the soluble matters are first got rid of, and then the drying process thoroughly effected. The operation is commenced by allowing the timber to steep in boiling water for several hours, which removes all the soluble ingredients. At the lapse of this time it is dried, and again steeped or boiled in a weak solution of borax. The object of this is to remove the albuminous particles which will not dissolve out by the simple action of water, like the other more soluble ingredients. The action of the borax, however, produces this desirable result, and the albumen is then got rid of. The final step consists in removing it to a drying room heated by steam, where it remains during three days, at the termination of which it is perfectly dry. In France there are several large establishments for carrying on this drying business, and as the French employ more timber in permanent, or intended permanent buildings and erections, than ourselves, the workshops are kept generally very busy. It may be impossible to prevent the use of green timber, dating it from the time of felling, but it is not impossible to adopt some method of preparing it that shall prevent the wood of the floors, doors, and windows of houses two years old "gaping" in the face of their proprietors or tenants, as the case may be.

The Surveyor.

THE POCKET SEXTANT.

In our article upon the "Theodolite" it was stated that there was no other surveying instrument that could compare with it in point of range and accuracy. It frequently happens that in small surveys the use of a more handy and portable instrument is more desirable than extreme precision, accompanied with an additional expenditure of time and money. To use the theodolite properly some time is consumed in setting it up and adjusting it for the reading of angles, whether horizontal or vertical, and for other accurate and delicate observations. It is an instrument that can never be employed for rapid or flying surveys, and it is needless to remark that instances constantly occur where the circumstances do not warrant the adoption of the theodolite for the purpose of surveying. In these cases, there are two other instruments which, without possessing the extreme accuracy of the larger and superior instrument, are nevertheless admirably adapted for taking angles with sufficient precision for ordinary purposes. They are the pocket sextant and the prismatic compass. Both of them can be held in the hand, although the latter answers best when supported upon a small tripod. Both of them also demand some skill and practice upon the part of the observer, who ought to be well acquainted with the limit of their capabilities. In a word, he should know when to use them, and when not. It must not be supposed that we are advocating their wholesale employment in preference to other instruments. On the contrary, we simply maintain that they are, one or both, the proper instruments to use on certain occasions. Nothing is more ridiculous in the eyes of a practical man than to observe a young member of the profession lugging out a heavy 6-inch theodolite to take an angle, or lay off one, that could be equally well done with a pocket sextant, or even by the chain alone. In the one case he requires a couple of men to assist him with his cumbrous instrument, in the other he carries it in his coat pocket or in a sling case across his shoulder. At present we shall not refer to the prismatic compass, which was largely employed by those engaged in the great trigonometrical survey of England and Wales for filling in the details, but confine our attention to a description of the construction and capabilities of the pocket sextant, the shape of which is probably familiar to most of our readers.

This instrument is essentially a reflecting one, and in consequence its principle is founded upon the same data which govern all instruments of a similar character. Briefly, the results of all reflecting instruments are based upon the fact that the deviation of a ray of light after reflection at the index glass and that called the horizon glass, is double the angle of inclination between the two glasses. This will be rendered clear by a reference to the diagram. Let A represent the index glass of a sextant, which is moved by the index arm as required, and B the horizon glass which is fixed permanently in a plane perpendicular to that of the instrument. The angle of inclination between the two glasses in any one given position will therefore equal in the diagram the angle A D B. If we imagine R to represent a ray of light impinging upon the mirror A, it will be reflected from A to B, and by the laws of optics the angle of incidence R A E will equal the angle of reflection B A D. On arriving at B, the second mirror, the ray of light will be again reflected in the direction B C, making, according to the same law, the angle A B F equal the angle C B D. The total deviation of the ray of light is measured by the angle A C B, and by the conditions of the problem this must be equal to twice the angle A D B, or that between the index or horizon glasses.



In the two triangles A H C, B H D, the angle A H C equals the angle B H D, and consequently the remaining angles, H A C, H C A of the one triangle equal the remaining angles H B D, H D B of the of the other. But the angle H B D, being the angle of reflection, equals the angle A B F, which is the corresponding angle of incidence. This latter angle being the exterior angle of the triangle A B D, equals the two interior and opposite angles H D B, B A D; therefore the angle H B D equals the angles H D B, B A D. From above, the angles H A C, H C A = angles H B D + H D B; therefore substituting for H B D its value of the angles H D B + B A D, we have the angles H A C + H C A = angles B A D + 2 H D B. But the angle B A D, the angle of reflection, equals angle R A E, the angle of incidence, which is equal to angle H A C; therefore the remaining angle H C A or A C B equals 2 H D B, or the angle of deviation of the ray equals twice the angle between the glasses. This angle is practically equal to that subtended by the object and its image at the eye of the observer. The difference between it and the actual theoretical angle is usually called the parallax of the instrument, which may be altogether eliminated by properly handling it. When the eye of the observer, the centre of the index glass and the object, form three points in the same straight line, this error becomes reduced to zero. In order to obviate the necessity for first registering an observation and then doubling it to obtain the angle required, the divisions on the arc or limb are marked double what they really represent, so that the correct angle is read off by the vernier at once. The ordinary pocket sextant reads to single minutes, which is quite sufficient for the purpose of practice. In reading the angle, care should be taken to bring the microscope perpendicularly over the vernier, or else the true reading will not be obtained. A reading taken "on the skew" will not be accurate, and moreover the practice is a vicious one.

Having now described the instrument, and shown its applicability for the purpose of surveying operations, it may perhaps be asked, What are its defects? When ought it not to be used? We will first answer the question and then conclude our article with some practical hints respecting the manipulation of this valuable assistant in the field to the professional man. In the first it is not applicable to objects which do not lie approximately in the same horizontal or the same vertical plane. Strictly speaking, the two objects, the angle between which is required, ought to be situated exactly in the same plane, but a little departure from this rule is of no practical inconvenience. The observer, even if his eye be no guide to him, can always tell in taking the angle whether this condition is fulfilled or not, as he will be obliged to incline the sextant to one side or the other, in order to obtain the necessary overlapping of the objects. This is a point that requires attention, for angles observed between two objects, situated widely out of the same horizontal or vertical plane, are incorrect, and a survey so conducted will not "close" properly. We have known considerable errors arise from ignorance and neglect of this necessary precaution. This is one of the points in which a sextant is inferior to a theodolite. Should it, however, be absolutely indispensable for want of another instrument to find with the sextant the horizontal angle between two objects which are not situated in the same horizontal plane, the actual oblique angle may be observed, and the true horizontal angle deduced from it. This is a case that rarely occurs in practice, and one that should be sedulously avoided.*

The calculation is of a very troublesome and complicated nature, involving the principles of spherical trigonometry, so that we shall not refer to it in detail. The pocket sextant offers a ready method of laying off right angles, for by setting the vernier to ninety degrees it really becomes to all intents and purposes an "optical square." This latter instrument, as has been already mentioned, is nothing more than a small sextant with the mirrors fixed at the angle of 45°, and incapable of recording any other. The mirrors of a sextant after some use get very dirty. The best way to clean them is by the use of a small light brush. A telescope is frequently attached to the instrument, but it is of very little practical use, and only complicates its manipulation. When once put in thorough adjustment a sextant, with proper care, will last so for a very long period.

BRIEF CHAPTERS ON BRITISH CARPENTRY.

By Thomas Morris.

THE artistic incidents of carpentry attract the architect's feeling as strongly as the scientific and practical relations engage his graver consideration. It will be here attempted to sketch the more prominent elements with some regard to historic order, from a time when the carpenter began to encroach on the mason, to the present, at which he, in turn, is yielding to the worker in iron.

Few have devoted to English antiquities more diligent investigation than the late John Britton, and he notices that "the gradual progress of the art of building with timber is a subject of which a judicious account is a desideratum." (Dictionary of Architecture.) Smith's "Specimens of Ancient Carpentry," engraved and published by Seago, in 1787, are unaccompanied by any letter-press whatever; and Abraham Swan's book, 1759, shows but a confused condition of mind, as though he were halting between two opinions, for the old system had been in great part relinquished, and new principles were even at that late period imperfectly understood. Such authors as Nicholson and Tredgold developed special branches, but with practical aims rather than literary or artistic views. Something has been done since Britton penned his remarks; Messrs. Brandon and others have rendered good service, but the want has not been fully supplied. Mr. G. E. Street has directed his great talents to the English woodwork of the thirteenth and fourteenth centuries ("Transactions of the Institute," 1865), and this circumstance imposed some slight restrictions on the scope of an essay I subsequently wrote, from which the subject matter of my present chapters will be principally drawn. The restriction is rather nominal than real; but I derive pleasure from this recognition of Mr. Street's labours, and advantage from the information they afford. Such an account as Britton contemplated is not easy of accomplishment, but may probably be best supplied by gathering into a connected review the intelligent observations of many minds made in limited fields, and exercised on scattered examples, so that we may look for the best narrator in the most assiduous collector; but successfully dealt with, the subject is undoubtedly one calculated to interest not only those vocationally concerned, but a large exterior class. Under this impression I have contemplated some such contribution as the present to a compilation of the kind, and the purpose has been accelerated by facilities for which I am indebted to the Editor of The Building News. The labour, cost, and risk,

* A full description of the formula will be found in "Williams's Practical Geodesy," and the subject is well investigated in "Puissant's Géodésie."

of engraving in a satisfactory style any considerable number of architectural examples are sufficient to deter many from the attempt who may have turned the leisure of years to laborious application in providing data Yet without such accompaniments the best descriptions are flat and unintelligible. The lectures of our best architects (when the description of objects, and not the inculcation of principles constitutes the theme) delight their audiences in delivery by the emphasis of conviction, and support of graphic demonstrations; but into what spiritless, dull and vapid narratives do they degenerate when the light of illustration is withdrawn!

I have spoken of mason and carpenter as in a sort of antagonism, but their respective pretensions may be considered. Among the primæval antiquities of this country, Stonehenge bears testimony that the practice of working in stone existed here in days far beyond the reach of history. Professor Nielson attributes it to a race of pre-Druidic fire-worshippers—Phœnician colonists settled here, and assigns it to the rites of Baal. The pillars and imposts yet remaining are but the weather-beaten relics of a circular temple, once possibly resplendent with elaborate figures and the ornamental accessories of art. English masonry during the influence of the Romans must have ordinarily displayed an elegance of design and perfection of workmanship suitable to the high cultivation of that polished people; while in later times were achieved the exquisite vaultings of the Royal chapels at Cambridge, Westminster, and Windsor.

But the conversion of stone is always costly, and in a country so well wooded as England, the early builders were presented by Nature with a building material of more easy and universal application. It is not surprising, therefore, that among our Anglo-Saxon ancestors wooden edifices should have obtained so completely that "to build" and "to timber" were equivalent terms. (Gwilt's Saxon Grammar.) In character it may not have been superior to the prevailing rudeness of the age, but its adoption was universal. That edifices constructed by Saxon and Norman builders, of wood, and covered with thatch or shingles, should have generally perished in a lapse of several centuries, with all the incidents of warfare, fire, neglect, and change of purpose or of taste, is less surprising than the actual existence of some few examples. But these sufficiently show that tenacity and duration were united in the material with lightness and facility of use.



Conway Castle.—Fig. 1.



Hartlepool Church.—Fig. 2.

Whatever the material adopted for enclosures and divisions, a good covering for protection against the weather was always necessary. In dry and sultry regions, the flat, heavily-formed terrace would be most agreeable; but in this country, where abundant rains are more to be provided against than excessive heat, the convenience and economy of timber could not fail to secure its general employment, while our instances of outer stone roofs, as at Willingham and Barneck, though perhaps more frequently met with in Ireland, are altogether minor and exceptional.

The covering of large apartments tried to the uttermost the structural resources of remoter mediæval times; stone and wood were made available in turn, according to aptitude or local production; masons and carpenters were long kept in active emulation.

Where the space to be covered with timber exceeded the compass of a single beam, it was usually divided into three parts, that in the middle being approximately double the width of either of those at the sides. The same arrangement took place where masonry was used, if the span were thought too great for a single arch. All such works, therefore, were closely assimilated in plan to the nave and aisles of a church. It is probable, indeed, that Continental churches formed the models for early imitation. In English examples of Norman date, arches of masonry crossing the aisles at the back of the piers remain in several buildings, as at Hartlepool Church (fig. 2), an interior finely engraved in "Billings' Antiquities of Durham."

The highly characteristic Norman Church of S. Peter, at Northampton, has such arches, and from the occurrence of shafts running upwards on the nave wall, it may be supposed that cross arches and gables were also intended there. If this surmise be correct, the accordance of design and arrangement, though not of detail, between this church and that of San Mineato, at Florence, could hardly be more striking and complete. San Zenone, at Verona, illustrated in the beautiful work of Mr. Gally Knight, by my late friend Mr. George Moore, and the French cathedral at Le Puy, admirably

represented by Mr. Street in the "Institute's Transactions, 1860-61," may be also noticed as examples of this form, and the last is further remarkable for the squinches or pendentives, that savour strongly of a Moresque source. This latter edifice is assigned to A.D. 950 to 1000,

The refectories or frateries, in which the inmates of great monastic houses assembled for meals, were necessarily spacious. In a manuscript account of that at Hereford, by the late Mr. John Clayton, it appears to have been 110ft. by 55ft. It was divided into centre and side parts by ranges of wooden pillars and arches. Considerable portions of the Norman timber-work remain mixed up with and enclosing some principal rooms of the Episcopal palace. But whether in religious or lay possession, these capacious apartments afforded the best opportunities for skilful roofing.

The large Gothic roofs are attributed by Kraft to the pride of the feudal times, and perhaps some measure of ostentation attends the uprearing of every colossal edifice, religious, military, or civil. The cathedral, majestic in form, intricate in design, mysterious in effect, the castellated stronghold of the noble, the hall of the municipal guild, the seat of a grand commercial corporation, the mansion of the man of affluence, may all owe to a sense of exultation in their projectors something beyond the strict proportion of means and ends. The same feeling has actuated monarchs and churchmen, Plantagenets and Wykehams, Parliamentary committees, boards of directors, and individual votaries of ambition. But whatever the cause to which our palatial halls are due, the skill evinced in their construction is even more astonishing than their extent. It would be a task of interest to follow a development so strictly in agreement with the circumstances of the times. So long as security depended on the command of armed retainers, and the baron met his vassals and serfs at a common table,

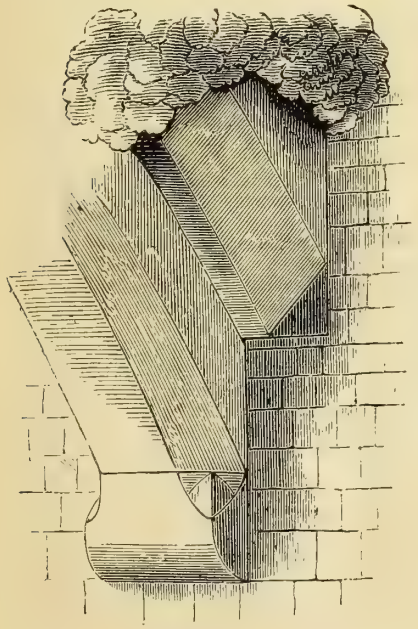


Fig. 3.

the great hall was well adapted to its purpose. But as commercial influence arose, and the establishment of personal freedom induced assiduity, the sentiment of loyalty inspired the entire nation. Thenceforward the military character of the baronial household subsided, the refinement of manners brought a variety of apartments into request, and the chief feature of the ancient mansion disappeared. My purpose, however, is to indicate their rise rather than chronicle their fall.

The first Edward repeating in Wales the war policy of William in England, secured his conquest by the erection of stately and impregnable castles. That at Conway he built in 1284. "A more beautiful fortress," says Pennant. "never arose. Its form is oblong, placed in all parts on the verge of the precipitous rock. One side is bounded by the

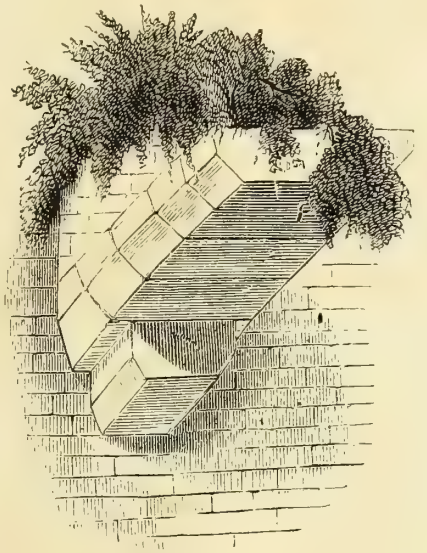


Fig. 4.

river, another by a creek full of water at every tide, and most beautifully shaded by hanging woods. The other two sides face the town. Within are two courts, and on the outside project eight vast towers, each with a slender one of amazing elegance issuing from its top, within which had been a winding staircase. The great hall suited the magnificence of the founder. It extended 130ft. in length, was 32ft. broad, and of a fine height. The roof was supported by eight noble arches, six of which still remain." These arches carried gables in the manner already described, and they serve to elucidate an old term, not always intelligibly defined—the gabled roof. The illustration (fig. 1), after Cotman, shows the picturesque condition of the ruins, but on personal examination I found the springings of the arches more in the form of the marginal sketches, Figs. 3 and 4.

(To be continued.)

THE NEW ASSESSMENT OF DUTIES ON BUILDING LEASES.

ALMOST inexplicable and inconvenient change of practice has lately been adopted by the Commissioners of Inland Revenue with regard to the stamp duties chargeable on building leases. These leases involve immense interests, and any event tending to invalidate them must carry with it a corresponding degree of apprehension. It is not surprising therefore that the *Times* and the law periodicals have been lately teeming with correspondence on the subject.

The case of "Boulton v. Commissioners of Inland Revenue,"* has produced an unwonted commotion. It arose upon a lease granted in 1869, whereby in consideration of the yearly rent and covenants therein reserved and contained, the lessor demised to the lessee four pieces of ground with four messuages erected thereon, for 99 years from March 25, 1868, at the rent of £8 8s. for each piece and messuage. The lessee covenanting *inter alia* to complete each of the messuages with all necessary fixtures, &c., to make footpaths, and to keep the building, drains, &c., in repair.

The lease was liable to an *ad valorem* duty of 30s. on the rent; but the Commissioners assessed it as liable to a further duty of 35s. in respect of the covenant by the lessee to complete the buildings. Such covenant, as they contended, falling within the latter part of the 16th section of 17 and 18 Vic., c. 83, which latter part runs thus, "and in any case where any deed or instrument, which shall be chargeable with any *ad valorem* stamp duty in respect of any sum of money, yearly or in gross, or any stock or security therein mentioned, shall be made, also for any further or valuable consideration, such deed or instrument shall be chargeable (except where express provision to the contrary is or shall be made in any Act of Parliament), with such further stamp duty as any separate deed or instrument made for such last-mentioned consideration alone, would be chargeable with, except progressive duty.

On hearing counsel for the appellant, and without calling on the counsel for the Crown, the Court gave judgment in favour of the Commissioners. Thus every building-lease granted during the last fifteen years becomes subject to this 35s. duty; but the Commissioners will not impose penalties where leases affected by the decision are brought to be stamped within a reasonable period after the decision. The Chancellor of the Exchequer proposes some amelioration, by releasing from the extra stamp all building-leases more than four years old; that being the period during which the Inland Revenue Commissioners have commonly, it is said, exacted the duty, according to a new light, which seems at about that period to have dawned upon them. Solicitors of experience and extensive practice, however, declare that until the decision in Boulton's case, they never saw a lease so stamped. The decision of the Court of Exchequer is objected to, because it seems as if some further consideration than the rent passed to the grantor of the lease, which is not the case, as the rent is intended to issue from a completed house, and is not, strictly speaking, secured until the house is complete. If the lease was delayed until the house was complete, no covenant to finish would be necessary, and no extra stamp duty would become payable, and it is a mere matter of convenience that the lease, should not be so delayed. No larger or "other valuable consideration" than the rent passes to the landlord, whether the lease is granted before or after the building is complete.

But whatsoever may be the scale of duties acted upon in future, there should be no retrospective application. The Chancellor of the Exchequer seems to perceive this, and it is to be hoped that in order to remedy a grievance so important in its consequences an Act will be passed to free all leases up to its date from the proposed surcharge.

To Mr. T. W. Webb we cannot but suggest that when a gentleman publishes observations on a judgment delivered in one of the superior Courts of Common Law, the court, and the date of the trial, the names of judge and counsel, together with some intimation of the writer's position and qualification ought to be put forward plainly, instead of incidentally, or being left altogether undisclosed.

* "Observations on Boulton v. Commissioners of Inland Revenue." By T. W. Webb. Vacher and Sons.—Letters of Messrs. Hopgood, and Messrs Allen, Colley, and Edwards.

THE FELTON PORTRAIT OF SHAKESPEARE.—This celebrated picture forms part of an estate in course of administration under orders of the Court of Chancery, and will be brought into the market; indeed, the sale is announced to take place at Christie's, on the 30th of April next. This has been supposed to be the portrait from which Droeshout engraved his plate, or has been copied from the plate which was the first portrait published of Shakespeare, and has the reputation of Ben Jonson's testimony of its resemblance to the immortal bard. The Felton portrait is painted on wood, life-size, little more than the countenance remaining. On the back is an inscription in old writing, "Gu. Shakespeare, 1597.—R. B." presumed to be Richard Burbage, a well-known player and artist contemporary with Shakespeare, and to whom report has always given the honour of painting the only portrait for which Shakespeare sat; but, after all, this is but rumour.

THE PEABODY ESTATE AT BRIXTON.—At last, something like justice to the wishes of the late Mr. Peabody, who purchased this valuable sixteen acres of land at Brixton, and invested it in trustees for charitable purposes, is to be carried out. The property has remained dormant some years, and on the death of Mr. Peabody it was claimed by the Crown, on the ground of his being an alien; but it has now been conveyed back to the trustees, who have made their first effort to utilise the land. The cricket pavilion and other superfluous buildings are to be demolished forthwith, and the land—a large portion of which is already let—laid out for building purposes. The property will yield a large revenue, which is to be applied to charitable purposes among the poor of Lambeth.

The Fine Arts.

THE NEW BRITISH INSTITUTION.

THE New British Institution! As we read the title of our catalogue, and looked at its primrose-coloured cover, our thoughts recurred to the past, and we began to expect a new spring crop of modern pictures, bearing some relation to the noble collection by which the Royal Academy has just fulfilled the autumn functions of the defunct exhibition. The title provoked the comparison, and we smiled as we entered the little drawing-room which shelters the tiny offspring of Mr. Gullick, containing, "toppers" and all, 211 pictures of the cabinet size. But we wish well to the effort, and trust that the little one may grow up into more manly dimensions hereafter. We cannot but think that the old British Institution, as far as relates to its spring collection, died out before younger and better managed exhibitions, and we rejoice to see that in the New the artists are to do their own work and manage their own affairs. One thing however forcibly struck us on entering, and the very smallness of the collection made it more instantly apparent—the absence of any one first class picture to raise this new exhibition above the dead level of the commonplace in art. Certainly the picture which most nearly attains to this position is "Blue Bells," sent by Mr. Wallis. It is painted with a certain refreshing purity of colour, and tender sentiment for spring, which quite makes you forget how very large the flowers are, and the unnatural height of the figures. It is one of the gems of the exhibition. P. F. Poole, R.A., exhibits one of his romantic bits of rustic life, "A Welsh Peasant Girl," very lovely in feeling and effect. "The Cedar Grove," by A. MacCallum, is an excellent specimen of this painter. It is a powerful landscape, though perhaps a trifle cold in colour. The only fault we can find with No. 139, a landscape, by C. J. Lewis, is, that it is a trifle woolly in texture, and has a predominating grey, even in the foreground. "The Wounded Finger," by J. Hallyar, is cleverly painted; the old man is true to nature, and the action of the child very good indeed. No. 124, by the same painter, "A Child Asleep," is painted with great ease. C. Lucy is represented by two pictures—one a portrait of Mr. Bright, and the other a subject with several figures in it. Of the two pictures sent by Mr. Archer we prefer "Peasant Children bringing home the Heather;" it is a nice bit of subdued colour. "Household Gods," No. 164, by W. B. Scott, or the conjunction of the Pagan and Christian religions, is a good idea for a subject. Some of the figures are rather out of drawing. We cannot praise Mr. W. Linnell's "Study in the Fields," for it is a picture unworthy of the artist's powers. No. 50, a landscape, by W. Holyoake, is cleverly but coarsely painted. Mr. M. Anthony has two dashing architectural subjects, both taken from Spanish cathedrals. Several foreign painters have contributed to this exhibition. No. 93, "Souvenir d'Italie," by A. Baccani, is a work of great merit, the sky being really luminous. No. 84, "View in the Ardennes," by F. Lamorinière, is painted with feeling, and the morning grey very truthfully given. No. 205, "A Gossip," by T. K. Pelham, is too much of a copy of the late J. Phillips's school to be a good picture. It seems to us a pity that, recommending as he does moderation in all things, Mr. Cave Thomas should have made use of such very striking and flaring colours and such glaring contrasts in his picture of "Angels contemplating Men." No. 206, "Rake Hill, Hants," by A. Cole, is a nice little landscape, though rather too cleanly painted. The artists who have hung the pictures, and whose names are given in the catalogue, have done their work fairly well, and generally put the best pictures in the best places, and it is only when we glance upwards to the "toppers" to which we have already alluded that we come to the usual complement to the better works—the brace of snipes, the dead pheasant, the ever-recurring woodcock, the draped model, with a fancy title—that, highly exalted, swell the numbers, if they do not increase the merit of this collection, which, taken as a whole, is well arranged, well lighted, and sufficient in number to examine without fatigue, and which has our best wishes for its success.

TRAMWAYS FOR STREETS AND ROADS.

A PAPER on this subject was read on Wednesday night before the Society of Arts, by Mr. W. Bridges Adams. The following is a summary of the propositions laid down in the paper:—

1. That iron rails, as an improved mode of partially surfacing roads and streets, are desirable, as diminishing traction resistance, wear and tear, dust, mud, and nuisance.

2. That the surface of the rails should be of hollow or channel form, more or less transversely curvilinear, sufficiently deep to retain the wheels under the ordinary conditions of running at the required speed, and sufficiently shallow to enable the wheels to be drawn out, when required, on the ordinary road surface. The depth of the channel being so small as to permit the wheels of ordinary vehicles freely to cross them or run across them.

3. That the special vehicles fitted for use on these rails, whether for passengers or for goods, should be provided with elastic tires, yielding between tire and wheel, to prevent all noise, jarring, or vibration, and to run over the common surface as well as on the rails.

4. That the vehicles should have their wheels and axles so arranged as to work round the curves of very narrow streets.

5. That the rails should be so laid that the vehicles can pass from one wheel track to another, on level surfaces of the road, and preferably of iron without timber.

6. That it is desirable to use hot-air engines instead of horses for traction, when practicable, to draw or propel street vehicles on rails, to economise the wear of the roads, and get rid of dirt and muck; such engines being free from smoke, steam, noise, and all risk of explosion.

7. That the vehicles used in the streets should be capable of coupling into trains on the outskirts of towns, and attaching to small locomotive engines without nuisance, working round curves as sharp as those in the streets, on channel rails.

8. That those trains should communicate by the ordinary roads laid with rails, with building land all round the metropolis, traversing up and down any sharp curved roads of new localities.

9. That, except in the direction of foreign commerce, and for its purposes, a belt of land from five to seven miles in width, except where already built on round the metropolis, should be reserved, only to be used by the proprietary for woodlands, fields, gardens, orchards, and recreation grounds, having in view the health of the metropolis, and the economical and sanitary disposal of the concrete.

10. That the whole of the street and road rails of the metropolis and other towns and city suburbs should belong to the municipalities, subject to the supervision of a general Board of Works, and that the turnpike roads laid down with rails should belong directly to the State, represented by the general Board of Works.

11. That the working and repairs of these lines should be let by competition to contractors for given periods, the maximum rates and fares being specified, but leaving it open to the contractors to lower the fares, the rents payable by the contractors becoming revenues to the municipalities of the State.

As regards the metropolis, two of the most important street lines to commence with would be from the Marble Arch and over the new viaduct to the Bank, and from Westminster-bridge, along the Thames Embankment, to the Mansion-house, On the Embankment, which is still guiltless of noise and vibration, it would be most important to public comfort to keep it so, while providing for the annual transit of probably eleven millions of passengers over its surface, who, at one penny per head, would give a return of some £45,000 per annum, a probable net revenue of £28,000 on two miles of line, for the benefit of the Metropolitan Board of Works, and relief of metropolitan taxpayers. Or, if the rule of public companies is to obtain, with the object of getting rid of government responsibility, shareholders will no doubt be readily found to take the responsibility with a division of profits. It is possible that private companies making the lines and working them, and dividing the profit with the municipalities and the State, would, on the whole, in the present condition of commercial ethics and governmental perceptions, be productive of the least waste, and, consequently, the largest profit both to the public and the companies. It is occasionally argued that no profit should be made from transit, but this would probably soon involve a condition of debt, in the absence of stimulus. It would be better to go on lowering the fares in proportion to the increase of profit by good management. The calculations hitherto made in the paper assumed a reduction of fares to one-fourth the existing tariffs.

FRENCH TOWERS.

THE three French towers forming the subjects of our double page illustration, although of late date, possess characteristics of beauty and picturesqueness which must always win for them the attention and interest of such admirers of Gothic art as may chance to see them in the reality.

No. 1 represents the tower of the church of S. Germain at Amiens. It is situated in an elevated portion of the town, and is of the Flamboyant period. The circular stairway rising up beside the angle, and rather abruptly weathered into the roof, gives it externally a very quaint appearance. The view is taken from near the centre of the Place de Feurre.

No. 2 illustrates a tower in Paris, situated near to the church of S. Etienne du Mont, and attached to the edifice known as the Lycée Napoleon. It is not, however, of the same date as this building, which is of Renaissance character, and was founded by the first Bourbon king, Henri IV., date about 1595. The tower is of a period long anterior to this, but its original purpose or association we are ignorant of. The proportion of its parts is admirable, and the means devised for external access from the staircase at the angle to the floors is very suggestive.

No. 3 is a view of the tower of the church of S. Lui, in the city of Amiens, and is situated at the south-west extremity of the church, obtruding conspicuously on to the street. It is a rich and meritorious example of the Flamboyant style, the tracery in the tympanum of the doorway being most elaborate and elegantly wrought. The buttresses have cusped niches and panels, with pinnacle-like weatherings at each stage of their height, the whole being somewhat too profusely enriched with crockets, but the general appearance of the tower is both effective, ornate, and pleasing.

In presenting these illustrations of late Mediæval architecture, we venture to assert that the Perpendicular style in our own country, and the Flamboyant style in France contemporaneous with it, scarcely receive the notice they deserve, works of an earlier date absorbing attention, while the many peculiar merits of the styles just alluded to are either, as fashion declares, "damned with faint praise" or ignored altogether.

The illustrations are produced by the photo-litho process from an excellent drawing by Mr. John Cotton, architect.

Mediæval MSS.—In a paper read before the Society of Antiquaries on Thursday week, on the Monastic MS. Inventories still preserved, Mr. Mackenzie Walcott mentioned several novel facts, that all the Suffragan Bishops and Deans, and many of the other members of the new foundation, were of conventual orders; that juries of Londoners were sent to appraise the monasteries in the Midland counties, and that sums varying from £20 to £400 were paid "for tolerance or continuance" to Henry VIII. He also has found the Inventories of Winchester and Durham, early in the reign of Edward VI., and a precious fragment relating to Westminster Abbey soon after the Dissolution. The paper will be printed in the *Archæologia*.

Furniture & Decoration.

THE THEORY AND PRACTICE OF MODERN HOUSE PAINTING AND DECORATION.—WHITE LEAD.

By an Experienced Workman.

THE methods of manufacturing and preparing white lead for the painter's use are many and various, and would occupy a volume in description, and which would answer no purpose to enter into at length here, seeing that every information on the subject may be gained by consulting Muspratt's "Chemistry Applied to the Arts and Manufactures;" we shall therefore only now notice such facts as are useful to the house painter and decorator to know.

The white lead is of course a carbonate or oxide of lead—according to the method of its preparation. It is produced from sheet lead by two standard processes. One, the Dutch method, in which the reactions are effected by operating on metallic lead with acetic acid, and decomposing carbonaceous matters at a comparatively elevated temperature, and without any other moisture but steam; and the other, wherein the carbonate is thrown down from a solution of bassic acetate of lead, by transmitting carbonic acid through it. Large rectangular spaces are formed, enclosed by stout walls of brickwork or masonry, within which pots of acid containing coils of sheet lead are piled in stacks. These stacks are built up of layers of dung, acid pots, lead, and boards, alternately. Eight layers of pots usually constitute the stack. Spaces are left at one end in every other layer, in order to create a thorough draught. Every stack contains about twelve tons of metal. A period, varying from five to six weeks, is allowed to convert the sheet lead into carbonate. The English method is a similar process to the above, but, instead of dung, spent tanner's bark is used, which, although slower in its operation, has the advantage of not darkening the lead by sulphate of hydrogen, which the dung evolves. With tan, nine or ten weeks are required to carbonate the lead; by the latter method the particles of lead are more minutely divided and finer; consequently, in use it covers better. It used to be the practice to grind the lead into an impalpable powder, and make it up into cakes for the market, but the process was so destructive to the lives of the workmen concerned that it has been virtually discarded, except for small quantities sold as dry white lead. The practice now is to compound it at once with the linseed oil. This is effected by an apparatus called a kneader, somewhat similar to that used in large bread-baking establishments. This is a cylinder in which a square iron bar, furnished with arms, is fixed longitudinally, and is turned by steam-power. All the materials—white lead and oil—to the extent of eight per cent. of the lead compound, are introduced by the doors, which are firmly closed. When the two are mixed the paste is withdrawn and ground to make it more homogeneous. The purest white leads are alone fitted for the painter's use in interior decoration. There are several of these in the market under the names of London white, Nottingham white, flake white, and the Belgian white—called Kreuzer white, and numerous others not necessary to our purpose to name, these being all white leads, but differently prepared. Pure white lead when properly prepared is the most valuable white we have for mixing with oil and making of paints—it is a pure white which will keep its colour under all ordinary circumstances, and will mix with most colours without injuring them or being injured by them, and is capable of producing thousands of tints by admixture with other pigments; there is no other white with equal body when ground in oil, or that will cover as well; many substitutes have been tried, but none have as yet stood the test of practical use as compared with white lead. Its purity is not injured, or very little, by light, oxygen, or pure air, but is so, more or less, by sulhhuretted hydrogen, damp, and impure air.* In using it as a white paint, it is most durable, keeps its colour best, and is least liable to crack or peel if it is used with pure linseed oil alone, well mixed and passed through a fine straining sieve before it is used; it is well also to add a little black or blue to it in mixing, which will help to purify the white and resist the colouring effect of the oil.

In finishing white it is usual to add about one-third turpentine, as it assists its working in painting, but when it is used as flatting, *i.e.*, dead colour without gloss, we find in practice that the less oil is contained in the lead the more successful the flatting. We therefore beat the lead up in turpentine alone to a proper consistency; it is then left to stand for ten or twelve hours, when the oil previously contained in the lead will rise to the surface and may be skimmed off; if the colour is then too thick for working with, more pure turpentine may be added. We thus obtain the purest whites, and, by mixing, the most delicate tints of colour it is possible to get from white lead in oil. We have hitherto been speaking of pure white lead alone, which may be known by the purity of its whiteness, its great density, solidity, and absence of spongy or granular appearance. Age improves its quality. It is supposed that in time a portion of the water it contains evaporates, and it thus solidifies. When white lead has been packed in cask for a long time, when opened the lead will be found to have sunk or diminished in bulk considerably, or solidified. New lead is distinguished by a softness and oily appearance, and consequent want of solidity, but if the lead is really good, the difference between old and new is not of very great importance for the generality of work. Unfortunately, white lead is subject to great adulteration, and this is invariably done in the manufactory. According to Muspratt, all the white lead which is manufactured into paint is more or less adulterated. Again, he says that some of our English white leads are pure, also the Kreuzer white, but the compounds sold under the names of Venetian white, Hamburgh white, Dutch white, &c., are all adulterated to a very great extent.

The principal ingredient used for adulteration is sulphate of baryta, but whiting and other earths are used for that purpose, whereby its valuable properties are deteriorated and the public swindled.

Of three samples of white lead sent to M. Louret for analysis, the results were as follows:—1grm. of No. 1 contained 0·695 of white lead, and 0·305 of sulphate of baryta; 1grm. of No. 2 contained 0·340 of white lead, and 0·660 of sulphate of baryta; and 1grm. of No. 3 contained 0·282 of white lead, and 0·718 of sulphate of baryta; yet hundreds of tons of these mixtures are sold annually as white lead at three or four shillings a hundred weight less than the pure article. The adulteration may be detected by simply contrasting the pure white lead with such as is suspected to be adulterated. It is said that it may be detected by digesting the sample in dilute nitric acid, which dissolves the lead, but leaves the sulphate of baryta; however, it will be found that sulphate of bartya and whiting, when ground in oil, become discoloured in consequence of their want of body and greater power of absorbing oil. Glaziers' putty is an example of this. When pure it is made of good whiting and linseed oil alone; the oil turns the whiting into a yellow stone colour. It follows, as a matter of course, that if whiting or sulphate of bartya are mixed with white lead, the whiteness of the lead is impaired, its body weakened, and it will not cover as well. We have found in practice that two coats of pure white lead when mixed as paint will cover better or make a more solid ground than three coats of the slightly adulterated, or than four coats of the common or worst lead. Therefore it may be accepted as a fact proved by years' of experience, that in its general usefulness, its powers of preserving and giving protection to wood or other materials, in producing good work, and, in an economical point of view, pure white lead, although the dearest in the market, is in all essentials the cheapest in practical use.

Flake white is another preparation of white lead in the form of scales or flakes, hence its name, and is an oxidised carbonate of lead, somewhat purer in colour than the ordinary white lead, and is usually ground in poppy oil, and is principally sold by the artists' colourmen, but is of great service to the decorative artist when a pure white is required; also in the finishing of imitation marbles in enamel work, *i.e.*, polished paint. It may also be used with advantage in varnish, being exceedingly fine in texture, and free from grit. Zinc white is also a useful white, and may be used either in oil or water. It is a pure oxide of zinc, and has one or two advantages over white lead, inasmuch as it is permanent under all circumstances, and comparatively innoxious both in its manufacture and use; in itself it is a bad dryer, but salts of zinc is mixed with it, which causes it to harden. There are four kinds—snow white, zinc white, stone grey, and grey oxide. The first two are of an unalterable white colour; oxide of zinc is also used in paper staining. Notwithstanding all its good qualities, zinc white is not a favourite pigment with the house painter, principally on account of its want of body. In practice this is found a great preventative to its general use; it takes four coats of zinc white to produce as good a body as three coats of pure white lead will do, thus adding the extra cost of labour and material for one coat over and above the cost of white lead paint. It has, however, many admirable qualities, and may be used for special purposes with advantage; it is rather superior in whiteness to white lead, and is good as a finishing white, or with delicate tints on a ground work of white lead, and may be used in varnishing enamel colours.

If the chemistry of the future can discover a method of manufacturing it with an equal body to white lead, we may safely predict that it will supersede that pigment.

The deleterious effects of white lead upon the health of the workman is a well-known fact. The operative painter is peculiarly subject to its poisonous properties—its effects are seen in the pallid face, care-worn and wrinkled appearance, the attenuated frame, bad breath, and obstruction of the bowels, commonly called painter's colic; in many cases, paralysis follows after colic; we have seen the hands and arms drawn up and distorted and utterly useless. Lead has been found in many cases to have impregnated the whole system. It is scarcely possible for the painter in using white lead paints to escape its effects altogether, however careful and cleanly he may be in his habits, although we have known some who have lived to a good old age without having a day's illness which might be traced to that cause, but we are quite satisfied that much of the ill consequences may be traced to the workman's own want of care and cleanliness. We would strongly insist upon his washing his hands in every case before he touches his food, and clean the paint from under and about his nails. A good practice, which we are glad to see spreading, is to wear linen overalls, cap, jacket and trousers. He should always cast them off before he leaves his work, and not wear them constantly as

* In many of the small agricultural towns and villages in the Midland counties — Worcestershire and Warwickshire especially—the outside of the shops and house door and shutters are often painted in tints of stone colour and drab, and the mouldings picked out white; sometimes tints of pink and blue are introduced; these will keep their purity for years, and if it were not for the wear and tear with sun and rain, seem as if they would never require painting again. We need not speak of the other side of the picture as shown in its effects on paint in our towns.

some do ; he will thus get rid of all trace and smell of paint from his person until work time next morning. On the contrary, the man of careless or dirty habits, who does not adopt these necessary precautions, carries about with him continually the fumes of lead ; and when he sits by the fire at home at night, after his day's work is done, the heat will cause a vapour to exude from his garments, carrying with it minute particles of lead, which he and others in his immediate vicinity inhale to his and their detriment. When he is eating, the paint from his hands is transferred to his food, consequently he swallows particles of white lead, thus producing disease and all its attendant train of evils. This is not a fancy picture, but is a stern fact of everyday occurrence, and one which we have seen in numberless instances, and we fully believe that it is this gross carelessness alone that brings to our hospitals three-fourths of the cases of lead poisoning. There can be no doubt but that much of this evil may be avoided by attending to the before-mentioned simple precautions. It is a melancholy fact, that rather than take this small amount of trouble, many will suffer the excruciating pains attendant upon lead poisoning, and fly to gin or other spirituous liquors for temporary relief, thus adding to, instead of diminishing the evil ; fat bacon and other fatty meats are considered good as a preventative, as they help to clear the lead out of the system ; purgative oils occasionally are useful, but we believe in the good old adage that prevention is always better than cure.

THE STONEWORK OF THE HOUSES OF PARLIAMENT.*

THE condition of the stonework of the New Houses of Parliament is at last beginning to attract serious attention. When pieces of masonry varying in weight from 5lb. to 10lb. or 15lb. come crashing down, it is no wonder that some uneasiness should be felt, at least by those who reside in the Palace, or whose duties take them thither. Only a short time since a piece of carved work, weighing between 70lb. and 80lb., fell from the summit of the Clock Tower upon the roof of the house below inhabited by the record clerk of the House of Commons, Sir Thomas May. It passed through the iron roof as if it were so much paper, broke an iron girder, and was stopped only by the stout brick arches beneath. Another time a piece of about 18lb. weight fell into one of the courts and was shivered into fragments just after no less a personage than the Usher of the Black Rod had passed through. At another time a fragment weighing about 10lb. fell at the feet of the policeman on duty outside the entrance into Westminster Hall, at the south end, just opposite the Abbey. During every considerable storm a shower of pieces of stone, from the size of a walnut to an orange, rattle down upon the iron roofs. We believe, indeed, there is a special functionary appointed to go about the roofs and rake the débris into heaps. There is never any certainty as to when and where these sculptured morsels are going to fall; and the River Terrace, where on summer nights the members walk and smoke their cigars, is not likely this year to be so much frequented as usual. More pieces break off from the carved terminals supporting the gilt vanes than from any other parts ; the reason being that the rods which carry the vanes are of iron instead of copper, and as the iron oxidises its swell and splits the stone. In no remote time this defect is likely to cause the destruction of the upper parts of all the pinnacles. The only change likely to do much good is to substitute copper rods for the rods of iron. Besides this the stone is rotting deeply in broad discoloured patches, in regular lines all round what are called the string courses. Before it has been forty years in existence the New Palace of Westminster shows far greater signs of external decay than many structures of ten times its age. Certainly if reports, inquiries, commissions, and committees could have done any good, the new Houses of Parliament ought to have been about the soundest buildings ever reared. In the first instance a commission of scientific men and architects was appointed to ascertain the best kind of stone to be employed. These commissioners must have had what the Americans call a good time of it in prosecuting their inquiries, for they appear to have visited every castle, abbey, and ancient house in England. In the end they recommended the use of a magnesian limestone, geologically called dolomite, which abounds in Derbyshire, and of which Bolsover Castle, still, in fine preservation, though of the date of 1680, is built. So various is the quality of this stone that the same quarry will furnish the best and closest-grained seams and the most porous and most worthless. Sir Charles Barry, we believe, wished that an experienced practical man should be appointed to examine all blocks sent from the quarries. But the Government did not see the necessity of this recommendation, and the post was never properly filled. Two quarries were selected in Derbyshire—the Mansfield and the Anston. The former, unfortunately, could only furnish a small supply, but what it yielded was of excellent quality. The Anston quarry had an abundant supply, and of this the New Palace is mainly built. The difference between the two kinds of stone is now as easily distinguishable in the external walls of the building as the difference between brick and marble. The Mansfield stone is as sharp and true in outline as when it left the mason's hand ; the Anston stone in all exposed positions is fast rotting away. Experiments which have been made show that some of the stone employed is of a most porous kind ; indeed, a cube of stone nine inches square was found to be capable of absorbing no less than three pints of water in forty-eight hours. How many gallons, then, would the whole building absorb during two or three days' heavy rain ? and what must be the result when in winter the rain is followed by a frost expanding the absorbed water into ice ? As a matter of course the delicate carvings must crack into splinters. The process of decay is thus going on steadily and swiftly, and some remedy should be immediately applied. The report recommending the material to be employed in building the New Palace dwells upon the necessity of special care being taken in the selection of stones for the west and south-west faces, as there, it says, the greatest tendency to decay would always be found to exist. Upon what evidence this theory was based we do not know, but the exact reverse of what was predicted has happened, for it is in the east and north-east faces that the stone has most rapidly decayed. One can, in fact, draw a series of lines round the building where the stones are rotting, and these lines will be found to correspond with what are technically called the string courses, that is, the stone mouldings which project above and below the bands of carved work. Upon these the water drips from above, and then trickles over to those beneath, and so on from top to bottom, till the constant dropping wears away the stone, and the inscriptions are becoming illegible, and the little pinnacle carvings falling away. The same process has gone on, but not to so great an extent, at the Geological Museum in Jermyn-street, though the stones of that building, as might have been expected, were carefully examined when selected. It is to be feared, however, that most kinds of dolomite are too porous to withstand the London climate in their natural state. Their pores require closing to protect the surface from the action of moisture, the destructive effect of which is increased by the sulphureous acid which is generated in the London atmosphere by the hundreds of thousands of coal fires always burning. The Caen stone endures our climate better, as we see in Westminster Abbey—much of the east end of which is built of this material; but the Mansfield stone appears to be best of all in this respect.

Of course when the stonework began to decay, as it did before the New Houses were half finished, the methods proposed for its preservation were almost innumerable, some of them virtually amounting to a plan for rebuilding the whole structure. The favourite device, however, was to coat the stone with various liquid compositions, so as to fill up its pores, and keep them air and water-tight. About twelve years ago two of these inventions were tried on portions of the walls. One was a liquid prepared by Mr. Ransome ; another was a solution of silica, the invention of Mr. Szerelmey, a practical chemist, who has devoted his scientific knowledge to the discovery of preservatives against the decay of stone, wood, and iron. A committee, consisting among others of the late Professor Faraday, the late Sir Charles Barry, and Sir Roderick Murchison, was appointed to decide upon the merits of the competing inventions, and its verdict was in favour of Mr. Szerelmey's plan. The test of time apparently confirms the judgment of the committee, and the composition which it recommended has, after a lapse of eleven years, been re-examined. During the interval that has passed it has been severely tried, having, we believe, been scrubbed with wire brushes and with sand and sulphuric acid. Yet it remains as bright and vitreous as when first put on during a heavy shower of rain. Among other things petroleum and what is called liquid glass have also been tried. The petroleum makes the stones look black and greasy, but still it must to some extent fill up the pores, and so for a time retard decay, just as, we believe, the boiled linseed oil has done when applied to the Geological Museum in Jermyn-street. As to the water-glass, it is strange that any practical chemist could have thought of it for such a purpose. Water-glass is only silicate of soda. If all the stonework could be immersed in this for a year or so it would form on the outside a silicate of lime—hard and durable enough for all time. As it is, it has merely been smeared on with a brush like any other paint or solution. The carbonic acid in the air turns the silicate of soda into carbonate of soda, producing a mouldy efflorescence which is easily wiped off with the hand, and leaves the stone as exposed to decay as ever.

Besides these various compositions another mode of treatment is now, we believe, being pressed upon the attention of the Chief Commissioner of Works. This is nothing less than the cutting out of the decayed parts of the masonry and the substitution of stones of a better quality —in other words, the rebuilding of a considerable part of the Palace. In the end perhaps this remedy may prove to be the only effectual one, but it is obviously a remedy of a very desperate character, and ought unquestionably to be adopted only after all other measures have been fairly tried and failed. We certainly do not think it can be said that this has yet happened. Indeed, there is very strong practical and scientific evidence in favour of at least one of the protective compositions which have been already tried. The plan of cutting out the decayed stones would be very costly—in fact, the cost would be indefinite : once begun it would be difficult to say where it should stop. It is perfectly plain, however, that the present condition of the Palace of Westminster is not only disgraceful, but even dangerous.

* From the *Pall Mall Gazette*.

International Etching Society.—An International Etching Society has been founded at Brussels by a band of artists, of whom MM. Félicien Bops, Th. Hippert, C. Tan Camp, Louis Arton, the Baron H. de Beeckman, the Baron Jules Goethals, Eugène Smits, Baron Georges de Snoy, and G. Van der Hecht are the best known. The objects of this Society, as stated in its programme, are to encourage and extend the taste for etchings ; to publish two monthly volumes of etchings, and to organise exhibitions of everything connected with engraving. The proposed publications are to consist of an album containing at least three etchings every month, on fine paper, and accompanied by letterpress when necessary, and of a *cahier d'etudes*, in which every member of the Society will have the right to contribute ; the two publications to be of the same form.

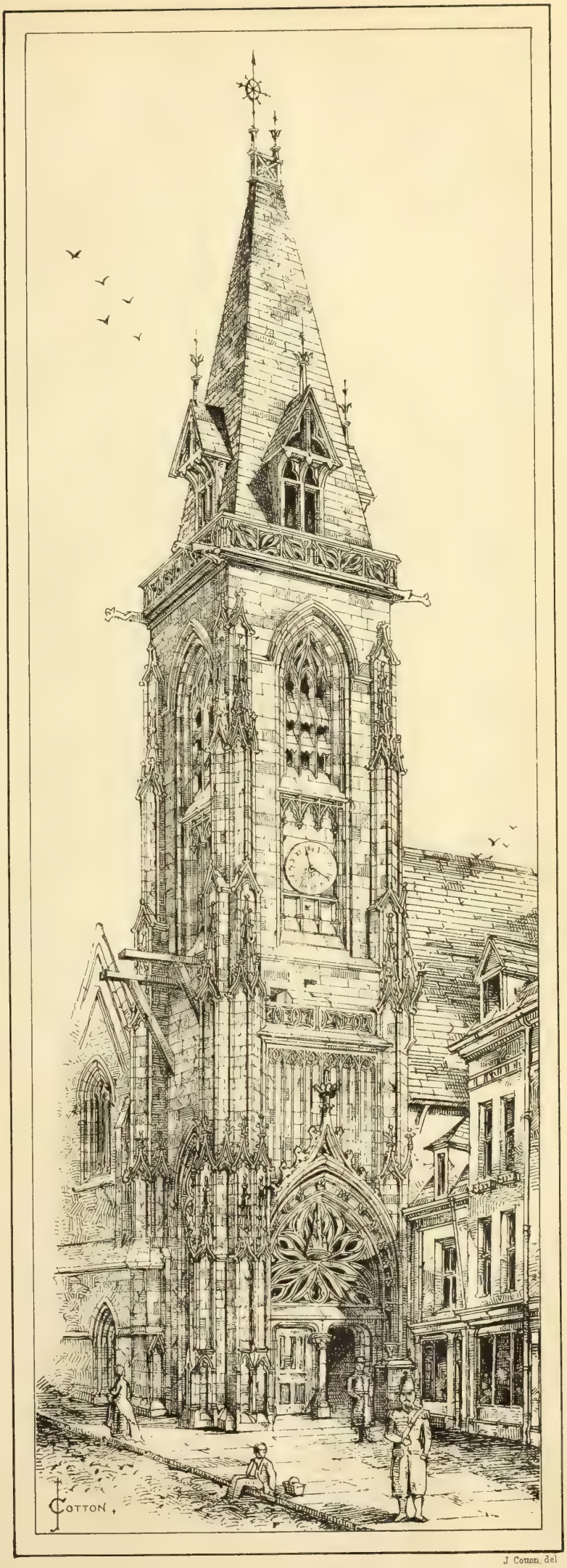
The Isthmus of Corinth Scheme.—A telegram from Athens states that an agreement has been concluded for cutting the Isthmus of Corinth by which the work is to be accomplished within eighteen months. The undertaking is not one of great difficulty, though the material to be removed is not the most favourable for such work, being a friable sort of mountain limestone, yielding slowly either to blasting or to the pick. The length of the canal will, we suppose, a little exceed three miles, and the mean height of the land above the sea level is, we believe, about 80ft. The effect of the work will be very advantageous to the Piræus, placing the Athenian port on the direct passage from Trieste and Brindisi to Constantinople and the Bosphorus. We have already referred to this scheme.

Associated Arts Institute.—At the usual fortnightly meeting on Saturday evening last, Mr. H. Ellis Wooldridge, vice-president, in the chair, Mr. H. C. Boyes read a paper on "The Position and Claims of Architecture as a Fine Art."



Photo-Lithographed by Whiteman & Bass, London

Tower of



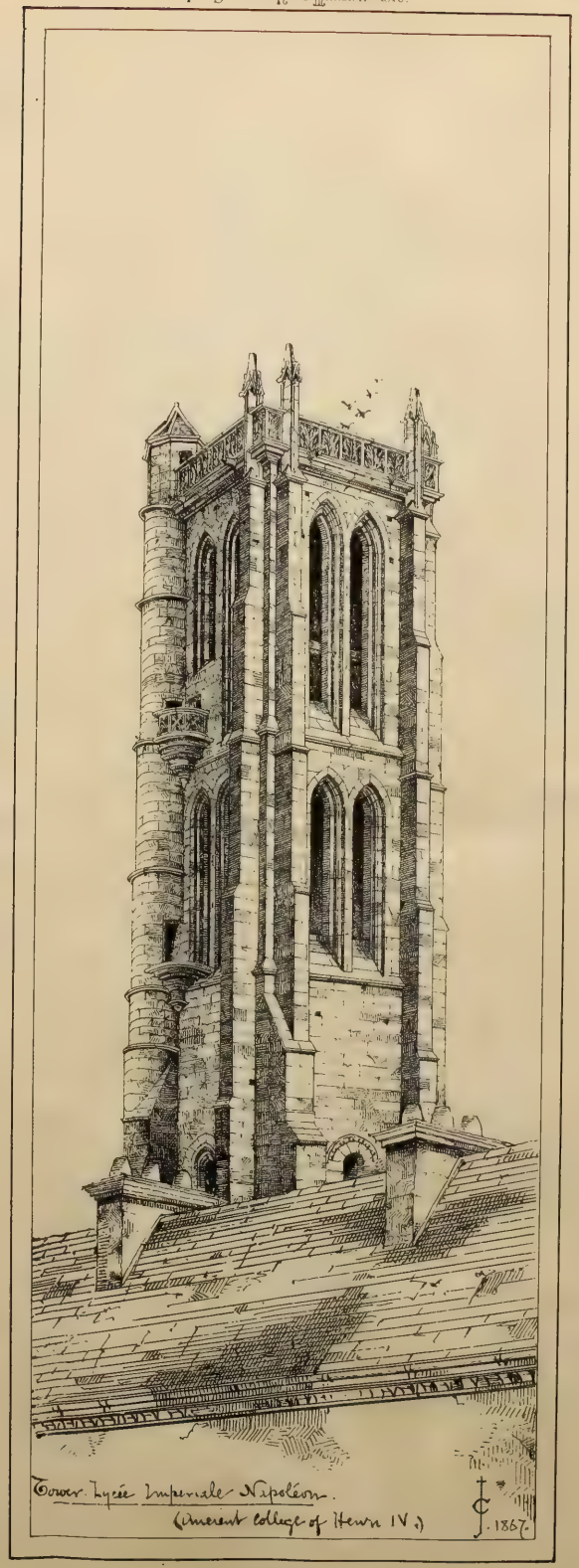
J Cotton, del

Tower of St Jul Amiens



Photo-Lithographed by Wareham & Bass London

Tower of St. Germain, Amiens.



near the Panthéon, Paris.



J. Cotton, del

Tower of St. Leu, Amiens.

Civil Engineering.

ON THE PENNAIR BRIDGE, MADRAS RAILWAY.*

THIS bridge was 1674ft. in length between the abutments, divided into 24 openings of 64ft. each by masonry piers 6ft. thick, 12 (6 at each end nearest the abutments) being founded on solid masonry, and the remaining 11 in the centre on brick walls. Details were given of the mode of putting in the foundations and of the fair work of the abutments and of the piers. The average height of the piers from the bed of the river to the underside of the girders was 20ft.; while they measured 29ft. in length, being built for the reception of a second set of girders, should it hereafter become necessary to double the line.

The superstructure consisted of wrought-iron plate girders arranged in pairs, 8ft. apart from centre to centre, each pair being 139ft. 10in. long, and continuous over 2 openings, connected transversely by means of 7 plate and 12 cross-bracing frames. The girders were of the double T section, 4ft. deep, and consisted of similar top and bottom flanges. Each girder, as sent from England, arrived where it was to be erected in 5 sections, of the following lengths, viz.: 2 abutment pieces of 21ft. 4in., 2 intermediate pieces of 30ft. and 1 centre piece of 37ft. 2in. The weight of each set of girders complete was 37 tons 3cwt., and of the sleepers and permanent way for each length of 140ft., 11 tons 17cwt., so that the total dead load was 49 tons, or 7cwt. per lineal foot of roadway, equivalent to 3½ cwt. per lineal foot on each girder of the pair forming one set. The greatest running load did not exceed 10cwt. per lineal foot on each girder, so that the maximum load to be sustained was about 13½ cwt.

In order to build the girders, a length of about 300ft. of embankment behind each abutment was levelled to a height of 1 foot above the girder stones, this area allowing four sets, two abreast, to be set up at one time. The first pieces of girder arrived from Madras by railway on the 21st of October, 1868. Setting was begun on the 24th of the same month, and by the 24th of December all the riveting was completed, as well as eight sets rolled; and the whole would have been rolled and in place by the end of that month if the masonry of all the piers had been ready for their reception. In these two months there were only 55 working days, during which time 12 sets of girders were unloaded, set up, and joined together by 34,000 rivets; the whole comprising 120 pieces of girder, 228 bracing frames, as well as all cover plates and other fittings, together weighing upwards of 370 tons. Four sets of girders were constantly worked at by four sets of men—one set of men being employed in unloading and setting up, another in fitting and screwing them up ready for the riveters, a third in riveting, and the fourth in rolling the girders across opening after opening, until they reached their destination. On the completion of the riveting, each set of girders was lifted with screw jacks about 18in. and double-headed rails, laid flat, were affixed to the lower flange. The end rails were allowed to project 12ft., so as to relieve the girders from the overhanging strain as early as possible. Three platforms of sleepers were now made, and on these, directly under the rolling rail, 12 cast-iron rollers arranged in groups of four were placed. Upon these the girders were lowered. Four similar rollers, secured to sleepers, having been placed on the girder stones of the abutment and the piers to be passed over, it only remained to fix the hauling tackle, which consisted of double purchase crab winches, secured to sleepers resting on the top flanges over the centre of the girder. A large double block was then attached to a bracing frame in front of the girder, and another similar block rested on the top of the second pier forward, and there was passed through these blocks a 6-in. Manilla rope, one end being secured round the second sheave of the first block, while the other end, after taking a couple of turns round the crab barrel, was passed back to two men, who coiled it fast as it was wound in on the sleeper platform behind the crab. The rate of rolling was about 1 foot per minute, provided no delays occurred; but owing to the time taking up in shifting tackle, and other occasional hindrances, the average rate of progress did not exceed 4 or 6 openings a day, or a distance of 420 feet, in 9 working hours. It was stated that the rolling system had been in use on the Madras Railway for some years, and that it had been found to be cheaper, safer, and more expeditious than the ordinary way of riveting on staging. The system had been applied with advantage to the placing in position of girders of much larger span than those described, by the introduction of a simple temporary trussing to support the overhanging portion in rolling. The lattice girders of a viaduct on the Paris and Orleans Railway, spanning openings of 164ft., were so rolled, as were also the plate-girders of the Grand River Bridge, Mauritius Railways.

The cost per set for erecting and fixing the girders in place, exclusive of the value of large tools, was £81, or £40 10s. per opening. The cost of fixing rails, rolling and lowering was about 34s. per opening. The value of materials used and depreciation of plant did not exceed £15 per set.

The Pennair Bridge was opened for public traffic on the 1st of August, 1869. The maximum deflection of the girders at the centre, with two engines coupled standing over and just covering 1 opening, was ½in.; this deflection was increased $\frac{1}{32}$ or $\frac{1}{16}$ or say a total of $\frac{9}{16}$in., when the same engines were run at a speed of 40 miles an hour over the bridge. With both spans uniformly loaded, the points of contrary flexure were each 48ft. from the abutment piers, and the points of maximum deflection 24ft. from the same. When, however, one span only was loaded (say with engines) the point of flexure in the loaded span was about 54ft. from the abutment, and the point of maximum deflection was situated at about 27ft. from the face of the same abutment. The calculations from which these results were derived were given in an appendix.

* Read before the Institution of Civil Engineers, by Mr. E. W. Stoney.

NOTES ON SOME OF THE TIMBER BUILDINGS IN ENGLAND DURING THE MIDDLE AGES.*

By Charles Baily.

(*Concluded from page* 160.)

THERE are still remaining at Crowhurst Place some old shields of arms in stained glass, which were once part of the glazing of the old windows. On one of these shields is the coat of Gaynesford, argent, a chevron gules between three greyhounds, statant sable; and also of Poyle, argent, a saltire gules, within a bordure of pellets Or impaling Wakehurst, Gules, a chevron engraile nargent between three falcons argent, and relates to Sir John Gaynesford, whose mother was Margaret Poyle, and who married Anne Wakehurst. He died A.D. 1460, and is buried on the south side of the chancel of Crowhurst Church. In another shield the coats of Gaynsford and Poyle impale Covert, gules, a fess ermine between three martlets Or, and refers to another Sir John Gaynesford, the sixth of the name, whose first wife was Katherine Covert, and who dying A.D. 1543, was buried at Guildford. In a window on the staircase at the back of the hall are the three ostrich feathers of the Prince of Wales, on the quills of which are the words, HIC DIEN, intended for ICH DIENE; and on each quarry of the glazing is the badge of the Gaynesfords, the grapnel with double flukes.

Except the plain lozenge-work, it is not often that we find in the south of England an original glazing of plain glass remaining.

In Lancashire and in Cheshire many of the old timber houses still retain much of the original glazing of the windows. At Little Moreton Hall, situated about three miles to the south of Congleton, in the latter country, the several windows give us no less than six different patterns of glazing in leaded lights.

In the cornice over the great bow-windows of the hall, and of the withdrawing-room, each of which in the plan is enclosed by five sides of an octagon, are the following inscriptions, carved in the woodwork, together with the arms and crest of Moreton:—

"God is al in al thing.—This windovs whire made by William Moreton in the yeare of oure Lorde MDLIX.

Rycharde Dale Carpeder made thies windovs by the grac of God."

Until of late years, glass has at all times been a very costly material, and it has often been asserted that many of the windows of the houses of the twelfth, thirteenth, and even of the beginning of the fourteenth centuries were left unglazed, and closed against the wind and the weather only by wooden shutters. The existence, however, of the iron hooks, of the hinges, or of the shutters themselves, is not sufficient evidence that the windows were not glazed or filled with some other material which would let in light; and it is somewhat strange that it is often the windows of the principal rooms in very important buildings where these shutters are still to be found; such as the hall of the Bishop's Palace at Lincoln, and the hall of Winchester Palace; and if any portion of a window, for the sake of economy, was left unglazed, that part would more likely be the upper lights rather than the lower, inasmuch as the inclemency of the weather would be in that case less felt than if the lower lights were open. It is, however, quite certain that sometimes other material than glass was used.

In an old account among the MSS. preserved at Loseley House, in Surrey, of the time of Henry VIII., we have the entry for two hundred of horn "occupyed at Cobham Park, in reparynge of wyndowes at the settynge up of the kyngs majesties howses ther, at 3s. 10d. the hundred, 7s. 8d." Another item is for "a thousand of lantern horns for the windows of timber houses;" but the timber houses here mentioned appear to refer rather to temporary edifices in the field, prepared under the direction of Sir Thomas Cawarden, master of the king's revels, tents, hales (halls), and toyles. Another for "gilding the lead or lattice-work of the horn windows." These notices prove that horn was a material much employed for the transmission of light through the windows of our ancient houses.

We conclude these notes with schedules of the prices of materials, and the accounts paid to the different classes of artisans for wages, at three periods of English history, and which throw much light on the subject of building in the middle ages.

First, in the years 1367-8-9 certain works were performed at the Royal Castle of Rochester, and we learn from the fabric-roll that—

Beer freestone cost from 9s. to 10s. per ton; Caine (Caen, in Normandy) freestone, 9s. per ton; and that Henry de Yeflee* received for 13 tons of Stapleton freestone, 8s. per ton. Reygat (Reigate) freestone cost 6s. per ton, and freestone from Farlegh (said to be Fairlight, in Sussex), 3s. 4d. per ton. Large pieces of stone from Bocton (Boughton Monchelsea), for lintels, cost 3s. 6d. the piece. Stones called nowel (newels for winding-stairs), 2s. and 2s. 6d. each. Stones called crests (coping-stones), 12d. to 16d. per foot. Stones called Lermer (stones worked with a projecting moulding to form a drip), 12d. per foot. Stones called spaces (coping-stones for the intervals or spaces between the battlements), 8d. per foot. Stones called tablement (strings, cornices, and plinths), 6d. per foot. Stone called "Parpeincoins" (squared stones, extending across the face of a buttress, so as to form the quoin at each angle), 5½d. per foot. Stones called "Senassheler" (squared stones with one face worked sloping, or askew, such as the set-off of a buttress), 20s. per 100 feet. Stone called "Paas" (the landing of a stairs, or flat paving-stones), 20s. per 100ft. Stone called "Squarassheler" (square-ashlar, worked stone for facings), 16s. per 100ft. Stone called "Pavement" (paving stones), 8s. per 100ft. Rag-stone cost 3½d. per cart-load. Squared chalk, 10s. per yard (probably per cubic yard). Block chalk, 3d. per ton. Tiles (query, plain tiles?), 3s. 8d. per 1000.

It is worth noticing that the lime was burnt with sea coal; 10s. 6d. per hundred was paid for the labour of burning the same, and the coals cost 20d. per quarter.

All articles of metal appear to have been very costly. The ironwork is charged at 2d. per lb., steel, 8d. per sheaf. "Wrest laches" of tinned iron, with their furniture, for the doors of the castle, 5½d. each, and tinned iron rings, with their furniture (probably for the latches), 4d. each. The locks for the castle doors cost 17d. to 24d. each. Tin for making the joints in the lead pipes is charged at 3d. per lb., whilst that for tinning ironwork, &c., cost 4½d. per lb. (the former at 3d. per lb. was probably mixed with lead for solder, and that at 4½d. per lb. was probably pure tin, which will account for this great difference in the price); but the nails, of all the ironwork, are perhaps the most costly articles; they are charged

* Read before the Architectural Association, Jan. 14, 1870.

* This Henry de Yeflee or Yeveley was one of the architects for rebuilding the walls and stonework of Westminster Hall, and with his partner Stephen Lote was contractor for the marble tomb erected by King Richard II. in Westminster Abbey. See *Transactions of the London and Middlesex Archæological Society*, vol. ii. p. 259, &c.

from 5d. to 18d. per hundred, these latter being "great iron nails, called spyking;" 1000 tinned iron nails for the doors of the castle cost 8s., and 2000 for the windows, 9s. 6d.

With respect to the wages of artisans, we learn from the same document that the director of masons received 8d. per day, and the ordinary masons 5d. to 6d. per day. Setters 3d. to 6d. per day. Carpenters had 3d., 4½d., 5d., and 6d. per day. Smiths, 6d., and plumbers 4d. and 6d. per day. For the carriage of material, carters, with their own carts, had 8d. to 10d. per day, and labourers 2d. to 4d. per day.

In the Rochester city records we have a few entries which show that in about two centuries after the date of the before-mentioned charges—viz., in A.D. 1578—the wages of workmen had increased very considerably; in fact, more than 100 per cent.

"Charges bestowed upon the ascehowse.

"Item, Pd to Thomas Sabine and his fellowe, for j dayes worke for to saw rafters for the same howse ij*s.*
Item, for iij dayes work to John Nicholles iij*s.*
Item, Pd to Thomas Ffoule, masone, for ij dayes worke upon ye towne keaye ij*s.* iij*d.*"

Ironwork still remained at 2d. per lb.

"Item, Pd to Thomas Waller, for iij ringells and iij thimbles of irone, wayeing xlviij*lb*, at ij of the pownde."

Oak timber is charged at about 2¾d. per foot.

"Item, for xxvij*te* foote of oaken timber, for two susters for the stayers belonginge to the Towne Keaye and for a plank for the foote vij*svid*."

On the 28th day of April, A.D. 1610, the rates of wages were assessed at Okeham, in the county of Rutland, by the Justices of the Peace, and from which it appears that—

	With Meat.	Without Meat.
A chief joiner was to receive by the day—Before Michaelmas	6*d.*	12*d.*
And from Michaelmas to Easter	4	8
A joiner's apprentice which hath not served four years, his wages—before Michaelmas	4	8
From Michaelmas to Easter	3	6
A master sawyer—before Michaelmas	6	12
After Michaelmas	4	8
A plowwright—before Michaelmas	5	10
After Michaelmas	4	8
A thatcher—before Michaelmas	5	9
After Michaelmas	4	8
A freemason, which can draw his plot, work, and set accordingly, having charge over others—Before Michaelmas	8	12
After Michaelmas	6	10
A rough mason, which can take charge over others—before Michaelmas	5	10
After Michaelmas	4	8
A master carpenter, being able to draw his plot, and to be master of work over others—Before Michaelmas	8	14
After Michaelmas	6	10
An expert carpenter—before Michaelmas	5	10
After Michaelmas	4	8
A bricklayer—before Michaelmas	5	9
After Michaelmas	4	8
A tyler or slater—before Michaelmas	5	10
After Michaelmas	4	8
A tyler's, or slater's, or bricklayer's apprentice—Before Michaelmas	3	7
After Michaelmas	2	6

It appears, by the high constables' catalogues of persons hired at the statutes from 1626 to 1634, that the rate of wages above set down was then complied with.

By the statute made in the fifth year of the reign of Queen Elizabeth, chapter the fourth, these following rules are enacted:—

That refusors to serve for the wages appointed are to be imprisoned.

That all artificers and labourers, being hired by the day or week, shall, betwixt the middle of the months of March and September, be, and continue, at their work att or before five of the clock in the morning, and continue at worke, and not depart vntil betwixt seuen and eight of the clock att night, except it be in the times of breakfast, dinner, or drinkinge; the which times at the most shall not exceede above two houres and a halfe in the day; that is to say, att euery drinkinge an half hour; for his dinner an hour; and for his sleepe, when he is allowed to sleepe, the which is from the midst of May to the midst of August, halfe an houre at the moste; and at every breakfast an halfe hour; and all the saide artificers and labourers, between the midst of September and the midst of March, shall be, and continue, att their work from the springe of the day in the morninge untill the night of the same day, except it be in the time above appointed for breakfast and dinner, uppon to looss and forfeit on penny for every hour's absence; to be deducted and dealted out of his wages that shall soo offend.

That euery person giuinge aboue the wages appointed, shall suffer ten days imprisonment, and forfeit fiue pounds.

That every person taking above the wages appointed, shall suffer on-and-twenty days imprisonment.

That every retainer, promise, gift, and payment of wages contrary to the statutes, is utterly voide, and of none effect."

The question has often been raised as to the kind of timber which was used in these old wooden buildings. It is a common opinion, even with practical men, that it is chestnut; but it is much more likely to be oak. There is great difficulty in distinguishing between these two sorts of timber, particularly after they have been a long time in use, and especially where oak imported from the Continent has been employed. There are two rules, however, which may infallibly be relied on. The one, whenever the feather appears on the surface we may be sure that the timber is oak: this figure is occasioned by cutting through longitudinally what is technically known as the quarter-grain, and which appears in the transverse section of an oak-tree in thin lines radiating from the centre pith; and the quarter-grain does not exist in chestnut. The other rule is, whenever iron bolts or nails have been inserted into oak timber, in anything like a green or unseasoned state, the sap of the oak acting upon the iron occasions a black stain in the wood; this is never the case with chestnut.

It is, however, very probable that chestnut, as well as all other sorts of native timber, was sometimes used, but not in large quantities, for there are few districts of England where chestnut timber grows in anything like a natural state, but oak is indigenous to our soil. Chestnut is seldom mentioned in old documents, and in the fabric roll of Rochester Castle, as well as in the Rochester city records, the timber mentioned is chiefly oak and "oken timber," with small quantities of "estrichbords called wainscot," and 28 "poplar boards," which latter cost 3s.

The paper was illustrated with a large number of sketches and original drawings.

THEORY, FUNCTIONS, AND INCIDENTAL USES OF CHIMNEYS. *

(*Continued from page* 161.)

FIVE different theories have been started during our period, for best shape of longitudinal section of chimney flues, namely:

1. The chimney is built with parallel side walls.
2. The sides are contracted at orifice.
3. The sides are enlarged at orifice.
4. The sides are contracted at half height.
5. The sides are enlarged at half height.

Each theory has its champions still, and though prepared to meet the issue in all its phases when required, I do not propose to encroach upon your time too much, since the position I maintain is based upon personal tests. The ably conducted contest, however, treated mainly the question of draught, whilst I consider it in conjunction with that of economy of fuel.

The height of smoke stacks for furnaces and boilers with chimney-draught is generally assumed, for an engine of 20 horse power, as not less than 60ft., by which, with a proper width of the stack, a good draught is obtained. To determine the horizontal section of such stacks, it must be considered that the combustion of 1lb. of coal requires, as a maximum, 150 cubic feet of air, of which one-third combines with the gases evolved from the coal, and two-thirds with the solid portion of the coal.

The combination of the air and gases increases their volume as much as one-tenth. That quantity combining with the carbon remains the same. The total product of the combustion, assuming the temperature of a furnace at 1000° Fahrenheit, at which aëriform bodies are expanded to about three times their ordinary bulk, will be 464 cubic feet for the pound of coal. Adopting reliable results, that the products of such combustion pass off at a velocity of 36ft. per second, the area to allow this quantity to pass off will be half a square inch; in practice, however, as a large surplus of air is always admitted, it is found advantageous to increase the area to two square inches. This will give for the average consumption of one horse power, equal to 13lb. of coal per hour on a square foot of grate, 26 square inches of area for the flue opening into the chimney.

As temperature and bulk become reduced in proportion to the distance from the fire, the area of the flue towards the chimney may be narrowed gradually, avoiding any sudden contraction, awkward bends, or sharp angles, and so as to reduce the area of the chimney itself to about three-quarters of the above, or 1½ square inch per pound and hour, as stated.

A common rule is that the minimum area of chimneys 72 to 90ft. high is 400 square inches for each 20 horse power.

The most correct shape of horizontal section of chimneys is, in relation to resistance of friction, the one which, for a given area, has the least circumference, consequently, the circular shape and the shape of a polygon. In the vertical section through axis it is usual to erect small smoke stacks prismatically, but to increase the thickness of walls towards the ground. Higher smoke stacks are built pyramidically inside as well as outside, in order to offer more resistance to the winds. While adhering to the latter forms, large factory stacks are given an interior slope of about 1½ inch, and an exterior slope of 2¼ to 3in. for every 10ft. of height. It may be laid down as a general rule, to determine the exterior lower diameter by adding one-twentieth, and the interior one by adding one-sixtieth of height of stack, to the corresponding upper diameters. For instance, if a stack is 60ft. high, and its upper diameters are 2ft. and 3½ft., then the corresponding diameters at base would be $2 + \frac{60}{60} = 3$ft., and $3\frac{1}{2} + \frac{60}{20} = 6\frac{1}{2}$ft. A round stack, in order to resist safely a wind of 100ft velocity per second, should have an exterior diameter of not less than one-twelfth part of its height.

The draught of a smoke stack being dependent upon the temperature of the rising air, it is important to protect the current against cooling off. Bricks being bad conductors of heat are therefore best suited for their construction among the cheap materials, but care should be taken to lay them with narrow joints, filled in solid throughout, so as to avoid a lateral access of cold air, which would act like a blow pipe. The bricks must be well burned, so as to have little porosity. The porosity of the soft brick is objectionable for two reasons; firstly, because the dirty humidity of the chimney and its accompanying bad odour will be transmitted to the adjacent walls; secondly, because the porous material offers plenty of passages through which cold exterior air may enter the stack in minute particles, when the inner air is much diluted and a strong pressure of wind acts from outside. Large chimneys should always be built with hollow walls; an air-space of an inch or 1¼ inch will answer best. At all events bends and irregularities should be avoided in any stack, and the inner walls should be plastered as smooth as possible, in order to reduce the friction of the air against the walls—that important element of smoky chimneys. It is advisable, when constructing large stacks, to wall in iron bars at intervals of 2 to 2½ft. across an inner corner, which form a vertical ladder for mounting the stack. The foundations of large stacks should be laid with extreme care, so as to avoid an unequal settlement of the masonry, which may cause the falling, or, at least, a dangerous inclination of them. The foundations should be started upon a base at least three or four times larger than the section of base of stack. Indifference in this respect has frequently led to disastrous results. Factory stacks receive, for better effect, belt courses and a cornice, similar to the capital of a column. These are best constructed of bricks, with an iron covering plate for protecting the joints against being washed out by rains, or of well-jointed cut stone. Heavy cast or wrought iron cornices should be avoided, since their larger weight increases the unavoidable vibrations of the stack during heavy winds.

By judiciously applying such well-known principles, the action of chimneys is brought within the domain of exact science. However, that accomplished quack, the smoke-doctor, will flourish, most likely, as long as the worthy medical profession are in competition with patent medicine.

The causes of smoky chimneys may be recapitulated, for dwellings, under two heads, the first of which contains the preliminaries for the success of the second; it is foreign to our present subject, and consists of a proper arrangement of the fire-places, whilst the second sums up thus:—

1. Insufficient height of the chimney.
2. Too small or too large a section of chimney.
3. Friction in the chimneys. Flues being built, very properly, adjoining, interfere with the working of each other if a building in settling has formed cracks in the partitions, and one flue is heated up, whilst the other is not.
4. Too large discharging orifice of chimney.
5. Action of wind, rain, and sun on the discharging orifice. This is remedied by raising the chimney, or fitting the well-known cowls on them.

A downward current of wind may, for a large orifice and a low velocity of the gases, press down the interior column in whole or in part, if it slides down along one side of the chimneys, and by friction carries along a part of the rising gases.

* Read by Mr. Adolph Cluss, of Washington, before the American Institute of Architects.

If the side walls of the chimneys have become wet in consequence of heavy rains, against which they have not been protected, the smoke stack will be robbed of a large amount of heat whilst the water is transformed into steam. This steam mingles with the air in the chimney, and forms a moist air which is specifically lighter than the dry air of same temperature and pressure, but does not thereby compensate at all for the above stated loss of heat. The flues should be covered in, therefore, so as to keep off the rain.

The strange fact that some chimneys won't draw when the sun is high and throws its rays in the mouth of the chimney is not satisfactorily explained. However, during warm weather, the draught must be smaller in the chimney on account of the smaller difference between the temperatures in chimneys and open air.

Now, if the main walls of houses and consequently also the side walls of chimneys are considerably colder than the exterior air—which is frequently the case in the spring, and also in the summer after continuous wet weather—and we have a continued hot sunshine, with no fire on the hearth, a cold column of air will constantly descend in the smoke-stack, unless the contrary is caused by favourable winds. Other causes combine, and it is necessary that the rays of the sun should heat the upper part of the chimney as much and as equally as possible, so as to lessen the weight of the column of air in the smoke-stack ; it is also necessary to keep off from the smoke-stack the exterior downward current, and all this is effected by properly arranged cowls.

6. Contrary draughts. — A chimney smokes frequently in a double parlour, because the fire in the adjoining room has a more lively draught, or in case the house is heated in part by furnaces, if the staircase is high, well heated up, and draws the air of the parlour more vigourously than the chimney, so that the smoke descends, in order to fill the void created. In this case the doors must be shut, the windows opened, and a strong fire must be made in the smoky chimney until the temperature of the chimney is high enough for establishing a regular draught.

7. One common chimney for several fire places. In this case independent metal pipes must be inserted for each fire.

8. Openings left at lower end of flue "for ventilating the latter," as called for in many specifications. The lower end of flue should be well closed, so that no cold air can enter and cool off the rising current.

I shall add only a few words in relation to smoke-flues as simple and efficient aids for ventilating apartments, wherever artificial heat supplies the time-honoured open fire-place ; which, whilst objectionable to economy of fuel and for keeping up draughts, conduces to health in replenishing the air. Adjoining or between two smoke-flues there should be inserted ventilation flues, commencing just below the cornice of the room to be ventilated. The necessity of placing the ventilation flues between the smoke-flues is obvious ; the thin brick partitions are heated up by the smoke-flues, and communicate this heat to the ventilating flue, which thereby sucks the bad thin air rising to the ceiling of the room, and leads it into the open air above the roof, where the ventilatiug flue ends, at same height with the smoke-flues.

According to size of room and number of persons occupying it, a corresponding number of ventilation flues are built ; for instance, one flue of 4 by 8in. will suffice for a room of 9000 cubic feet, which is occupied daily by eight or ten persons.

Rooms which are heated by iron stoves or furnaces are frequently filled with much dry air, and are freed from this, in part, by the flues described above, and in part by the ventilation flues in the outside walls, commencing 3in. above the surrounding ground, and leading to the room, 1ft. above the floor. It is necessary to have registers for these lower flues, in order to obviate cooling off during heavy winds. No registers are necessary for the upper flues, since the wind cannot descend from above if the smoke-flues are properly arranged, and the room will not be cooled off by the bad air being discharged. The wholesale rejection of ventilators near ceilings of rooms by a certain school of ventilation men is erroneous, since the elements of heat and the diffusion of gases are not given proper weight by them.

If carbonic acid, of course diluted by heat and other gases, would not rise, no smoke-stack would work.

Suppose we enter a room filled with pure air, containing no more than its constituent part of one-twenty-fifth per centum of carbonic acid, and having the normal temperature of 65°. The process of respiration raises this temperature to 98°, and vitiates it with 4 per centum of carbonic acid. The increase of heat dilutes, by expanding the volume, while the carbonic acid adds to the density. The result is that 1000 cubic feet of the respired hotter air weigh but 72lb., while the weight of an equal quantity of the colder pure air amounts to 76lb. By opening an upper register the foul air will escape, in consequence. If you do not provide an outlet above, however, it is easy to reverse the current. Judicious action in both cases is necessary. Too much and too little zeal in the good cause of ventilation has killed more people, by exposing them to undue draughts, than want of fresh air has ever done.

Where sewerage is not accessible, cesspools may be ventilated in like manner, so as to prevent the rising of the bad odour into the privies. The cesspool is to be arched, the manhole for cleaning it out is to be shut air-tight ; 9in. below the apex of the arch a ventilating flue is started in the wall with an opening of, say, 6in. wide and 12in. high, leading above the roof. This ventilating flue is connected with the smoke-flue of a range or cooking stove, being separated from it simply by a ¼in. thick cast iron plate. By the continued heating, in summer and winter, the smoke-flue heats the iron partition plate, and, consequently, also the ventilating flue, which sucks the bad air from the cesspool and any pipes or ducts leading into it, and conducts it above the roof.

The smoke pipe should be, in this case, about 14in. square, and the ventilating flue may be 6 by 14in. in addition.

In treating a detail in the science of construction, the temptation has been great to encroach upon the important subjects of heating and ventilation ; in fact, it has been difficult to separate it from these corollaries, but it is believed to be of more solid service to exhaust than to enlarge.

Let the community understand that the matured conclusions of men who have studied the physical laws underlying the movement of the air are worth more than the mere notions or vague ideas of the chimney-sweep and bricklayer, who have not the preliminaries for combining isolated phenomena to a correct observation, but who enjoy the hollow prestige of being so-called "practical men," and are admired if, by chance, they hit the case.

MODERN ROMAN ART.

A CORRESPONDENT of the *Standard*, writing on the Exhibition of Catholic Art, says it is a standing libel on Roman Catholic art. Catholicism has inspired some of the grandest works of human genius in every fine department. Architects, sculptors, painters, poets, musicians, have so illustrated it that there never can come a time when men will let its memory die. But what has Rome done ? She never had a great native artist of her own, and only in one or two instances has she failed to spoil and injure the artists she borrowed from other lands. She had the loan of Bramante and Michael Angelo, and what did she make them do ? What did she get out of them ? That splendid abomination, St. Peter's. There is not a single church in Rome—and there are nearly four hundred of them—that does not offend almost as much as it pleases ; and most of them are hideous abortions. Umbrian, Tuscan, and Lombard genius came to her assistance over and over again ; and she has blotted out and pulled down most of what they did for her, to make way for her own gilt and whitewash conceptions of the sublime and beautiful. I was in the Sacristy of St. Peter's the other day. There are in it some magnificent works of Merlozzo da Forli, jubilant angel heads that lift your soul up to Heaven. They are priceless, for this artist's works are rare. Few visitors ever see them ; and along with them are some paintings of Giotto, which nobody can see properly, so abominably are they hung. I wanted to have one of them turned, for I knew there was another painting on the obverse side. But it could not be done, and I was gravely comforted by the assurance that it was "only another Christ." Rome cares for size, for gilt, for gold, for marbles, for militant magnificence. True art she never cared for, and now she cares for it less than ever. You have no idea of the money that is being spent at the present moment in churches in Rome, but not a stroke of art is being contributed. The Exhibition faithfully reflects this spirit. It is a slander to call it a representation of Catholic art. Tuscany, Umbria, Lombardy, Germany, France, and England forbid ! It is a representation of what was never inspired by devotion or piety, but only by gingerbread ambition. To sever Rome from Roman Catholicism is to do the latter the greatest service in one's power ; and therefore one may rejoice that the Exhibition is what it is. "We needs must love the highest when we see it," it has been said ; but Rome has seen the highest and hates it. Fra Angelica, Giotto, Perugino, all in their turn showed her the right way, and she refused it. Bernini is her true prophet, and speaks her inmost soul.

EXHIBITION OF STREET TRAMWAY MODELS.

AN exhibition of models, illustrating the street tramway system, is on view at 35, Parliament-street, Westminster. It is promoted by the Metropolitan Street Tramways Company, with the object of illustrating the modes of locomotion which the public will soon have in the streets of the metropolis. Bills were passed last session, authorising the construction of lines in East London, the Surrey side of the river, and Pimlico, Peckham, and Greenwich. The first and second have been commenced, but some dispute with a local vestry stops practical proceedings with regard to the third. This exhibition receives additional interest from the numerous tramway projects in different parts of the country, for which legislative sanction is at the present time being sought. The line between Whitechapel and Bow will probably be the first finished. The car to be used is very similar to that seen in America—handsome, comfortable, roomy. It will convey 28 outside passengers and 22 "insides," affording to all ample seat space, and opportunity of passage, without the inconvenience which the ordinary means of conveyance, especially on a wet day, inflicts. The fare is fixed by Act of Parliament at a penny per mile, with an understanding that the charges may at any time be revised by the Board of Trade. Although the tramway carriage is narrower externally than an ordinary omnibus, it is 12 inches wider within, and very lofty. As one horse in a tramway is said to be equal to four on the road, the huge vehicle will be easily drawn by the customary pair. The promoters of the modern schemes have no doubt of their ability to avoid any hindrance or damage to the common street vehicles. The rails being level with the surface of the road, a carriage will be able to cross them without endangering its springs, as was the case with Train's ill-fated system, while the three-quarter inch groove in which the flange of the car-wheel runs is too narrow to entrap the flimsiest wheel of the most elegant vehicle, save, perhaps, the bicycle, which has not yet been made a matter of legislation. There are in the exhibition models of single and double lines. The gauge is unusually wide—over four feet eight inches. The company which has provided these miniature specimens has carefully collected statistics to show the working of tramways in America, Canada, and the European cities where they have been introduced. From them, it seems that in New York, in the year 1867, 78 millions of passengers were conveyed by 4380 horses, while in London 6677 horses drew only half that number. In Stuttgart, during 1868, the street tramways carried 60 times the number of the population ; in London the proportion was only 13 2-3rds. If the actual tramway works as the model promises, there can be no doubt the objections which proved fatal to the scheme when it was tried before will be no longer heard of, and all who have tried the experiment must acknowledge that on the score of comfort the tramway car bears somewhat the same comparison to the ordinary omnibus as the springless cart does to the phaeton. However, there is room in every large town for both systems, and the use of both, for a very long time to come, will be a necessity not to be avoided. "Perhaps," says the *Daily News*, "one of the most effective tramways at work in England is a line running through Salford. The main rails are simple iron plates, 'flush' with the roadway, but in the centre there is a smaller rail, with a thin deep groove, and into this runs a guiding wheel, which the driver can hoist at pleasure. Hence, if the 'rule of the road' demands it, he leaves the rails and comes back again to the familiar groove without trouble or delay. The tramways we are to have in London will not allow of any such de-

viation, and the wider thoroughfares will not, of course, so much require the advantages. The public interest in the revived question is shown by the numbers visiting the exhibition; and it is not a little singular that the exhibitor is frequently plied with queries as to the applicability of the plan to steam purposes."

WARMING AND VENTILATION OF HOSPITALS.

LAST week we gave plan, view, and general description of the new Wigan Infirmary, of which Mr. Thomas Worthington, of Manchester, is the architect. In the description accompanying his plans, Mr. Worthington makes the following remarks on warming and ventilating such buildings, which, though more especially applicable to the structure in question, will be found to be of general practical value:—

In an establishment consisting of wards of moderate size, it is believed that no means of warming is so effectual and so healthful as open fireplaces, very lofty in the opening; and by adopting an arrangement of a hooded hit-and-miss louvre (which has already been used with success), an excellent draught may be obtained. The entire sides and backs of the fireplaces would be built of firebricks, the inclination of the sides being at an angle of 45°, so that the heat may be reflected at a corresponding angle into the ward. The fire itself would be contained in a plain bar basket, with as little metal as possible exposed to the heat.

With regard to ventilation, it is obvious that the first essential is the proper allowance of air space; but with the most ample provision in this respect, it is necessary to have the means of changing the air contained in any hospital ward. Various contrivances may be employed to admit the outer air in such places, and in such a manner as to keep up an unceasing movement in the upper stratum of a ward, and a constant displacement of the foul gases which rise to the top of any room containing a number of persons, and above all in a hospital ward constantly occupied, daily and nightly, by diseased inmates. The great difficulty is, of course, to accomplish the object without causing currents, and it is proposed to do this in the following manner:—The windows in all cases would face one another, and be divided in their entire height into three subdivisions. The lower portion, for about three-fourths of the whole opening, would consist of an ordinary double-hung sash; the upper fourth be pivotted, and work on a swivel with cords, to open at any desired inclination. On the top of this swivel light, and, in fact, forming a portion of it, would be a continuous hopper-shaped frame, made of cast-iron. This frame would extend the entire width of the window. It would be glazed at the front and ends, but a space at the top left open about 2in. wide and the full length of the frame. This long narrow opening would be covered with fine wire gauze, and admit a constant but imperceptible stream of the outer air, which would be continually passing across the ward close to the ceiling, towards the corresponding opening in the opposite window. A slightly upward direction would be given by the sloping form of the hopper, in order that the air may be thrown towards the centre of the apartment, and be so distributed as to avoid down currents. Any or all of the three divisions might be opened more or less, at the discretion of the attendant; but when so opened to their full extent, the ward would in a very short time be flooded with fresh air. Besides this, however, there would be the opportunity of obtaining a current from the two extreme ends of the ward, and flushing the upper part with fresh air without opening the doors. This would be effected by means of a glazed louvre, about 6ft. high and 4ft. wide, placed at the entrance end, over the door from the staircase; and again at the other or balcony end. The louvres, worked by a very simple mechanical contrivance with lever and screw, may be adjusted to admit more or less air, as required, but practically would be very rarely closed. There would also, at various points in the walls, be air shafts or flues discharging above the roof level; and the ventilation may be further assisted by small air grids or channels built in the walls, at short intervals, close to the ceiling. These grids would have a sloping lip on the inside, projecting about 5in. from the wall, with an inclination of about 45°, to prevent the air falling at once in a cold volume to the lower part of the ward. A corresponding grid would be placed in the opposite wall in each case. The air being thus admitted in very small quantities and at very numerous places, would diffuse itself without perceptible draughts, and displace the gaseous portion of the contained air, which naturally ascends to the ceiling. The form of the small air channels would be such that they would hardly be observed if not pointed out, and are therefore not likely to be wilfully obstructed, especially as thay would be close to the ceiling, and therefore out of reach. On the ridge of the roofs may be revolving ventilators of large diameter, to promote the ventilation of the top wards.

Each ward may be lit at night by two suspended rings of gas burners, over which a funnel-shaped cowl may be suspended, terminating in an iron flue communicating with a shaft in the wall, by means of which the products of the gas would be carried off, while at the same time an upward current be caused, and a further impulse given to the ventilation during the night, when the windows are usually closed.

WASTE OF LABOUR IN BUILDING.

OF all the painful sights we are called upon to witness in this day of steam engines, and labour-saving appliances, none strikes us, says the *Scientific American*, as being so absurd and unnecessary as the waste of human toil in building as it is generally conducted. Hodmen crawling up long ladders with small burdens of bricks and mortar, carrying at each trip some sixty or seventy pounds of building material, with thirty or forty pounds of hod, and one hundred and sixty or more of flesh and blood—not to mention beer—seems something so foreign to this age of machinery that we should scarcely feel it more incongruous to see the stocks and pillories restored to our market-places.

If a huge beam or girder is to be raised, we see the crane, tackle, and steam engine employed, but the ordinary carrying is done by human legs. These legs, although they can do climbing passably, are certainly inferior in this respect to other legs designed by nature to make climbing a specialty.

A ladder is a very serviceable appliance in its way; we, however, believe it to be as hard a road to travel as ever the genius of man devised. The hod belongs to an ancient and honourable family of implements, but it does not seem the most agreeable companion in the world to clasp in affectionate embrace or place one's cheek fondly against.

Therefore, we say, down with the hod; let it take its place with the host of implements on the tomb of which modern progress has written the epitaph—"Played Out."

Let us suppose the two side pieces of a ladder to be replaced by iron rails and the rounds by ties, and let us suppose some genius to conceive the happy idea of causing a locomotive to crawl tediously up this heavy grade, drawing after it a load of one-third its own weight. What gibings, what laughter, what derision would such a scheme excite among mechanics? Yet we are importing annually large numbers of locomotives to do the same thing; only these locomotives run on the ties instead of the rails.

They do these things better in France. Either derricks are employed, or the brick and mortar carriers are used as stationary engines, rather than as locomotives. In passing a building in process of erection in Paris, one may often see a number of men stationed one above the other along a ladder, each of whom passes his load to the next above him, until the load reaches its destination. In this way a continuous procession of materials is kept up, and a large quantity may be elevated in a short time.

This is an improvement on the climbing process, but there must even in this way be an enormous waste of power. And this waste is not only useless, but so easily avoided, that the continuance of the employment of human power to perform such rude work, is a disgrace to modern civilisation. It can be demonstrated that a small one-horse power engine, with suitable tackle, and the employment of a single man to attend it, will do the work of six men at elevating bricks and mortar, at a cost of less than the wages of two men.

No mechanic who reads this will fail to see many ways in which this application of steam power could be advantageously made. The ladder might be replaced by a railway up and along which a car-load of bricks or mortar might be made to roll, which track might be joined to and made continuous with a horizontal track, by means of an easy curve at the summit, the whole being adjustable to suit the progressive heights of the wall as they advance towards completion. It would require little genius to adjust the detail, and the cost of building would be greatly lessened by dispensing with the hod carriers.

PARLIAMENTARY NOTES.

Stamps on Building Leases.—On Thursday week the Chancellor of the Exchequer said that having considered what had been urged in relation to this matter he thought it would not be just to insist on the limit of the indemnity he at first proposed. He therefore now only made it the measure applicable to the future, and should insert a clause by which stamps on building leases would be 10s. instead of 35s. Mr. Bourke expressed his great satisfaction at the statement just made, which would, he believed, satisfy the country. Leave was then given to bring in the bill.—On the order for the second reading of the Bill, on Monday night, Mr. Alderman Lawrence protested strenuously against the Bill unless the 10s. stamp was made uniform on all leases.—Mr. A. Kinnaird also protested strongly against the Bill in its present state, as acting most oppressively on the poor man.—The Chancellor of the Exchequer said that the Court of Exchequer had decided that leases in certain cases should be subject to a tax of 35s. each. He, in consequence, had introduced a Bill of Indemnity up to that time; but in order to prevent injustice in future cases he reduced the tax to 10s. Had he not done so leases would now be subject to a tax of 35s. Now hon. members asked him to omit the second clause in his Bill, which reduced the tax to 10s. He was willing to do so, but if he did so the tax would remain at 35s.—The Bill was read a second time.

Indian Railways.—On Friday last, in reply to Mr. Roden, Mr. G. Duff stated that the Indian Government was using all due diligence in the completion of the Indian system of railways. The great line from Lahore to Peshawur was in course of construction, and several others had been commenced.

The Tramways Bill.—This bill was read in the House of Commons on Monday for the second time.

Commons and Waste Lands.—Mr. V. Harcourt asked the Under Secretary of State for the Home Department whether, before the introduction of any further bill authorising the enclosure of commons and waste lands, her Majesty's Government would bring in a measure giving effect to the recommendations of the committee which sat last session as to the amendments required in the existing law.—Mr. Knatchbull-Hugessen said the Enclosure Commissioners had presented a bill to the Home Office for the enclosure of about 13,000 acres. The select committee which sat last year on the subject had recommended certain alterations in the existing general law, and recommended that no further enclosures should be made until those alterations were effected. The Government had prepared a bill for that purpose, but he could not name a day for its introduction, but until it was introduced he should not ask the consent of the House to any further enclosures.

The Newcastle-on-Tyne Improvement Bill, the Ellesmere and Glyn Valley Railway, and the Newcastle and Gateshead Water Bills were read a second time in the House of Commons on Wednesday. The Newry Water Bill was rejected on the motion for a second reading.

Building Intelligence.

CHURCHES AND CHAPELS.

Birstal.—Last week, Canon Heald laid the foundation stone of a new church at Brookroyd, Brownhill. The church, which is to be erected from designs by Messrs. Sheard and Hanstock, will be a Gothic structure, and will accommodate about 500 persons. The edifice will be 90ft. long by 48ft. broad, and will consist of the nave, north and south aisles, chancel, and vestry. It will have an open timber roof. The total cost of the building is estimated at £1700.

Burslem.—The Wesleyan Chapel at Burslem is to be considerably enlarged. Mr. John

Stringer, of Sandbach, has contracted to do the work, from the designs of Mr. George Woodhouse, of Bolton. The total cost of the alterations will be about £3000.

Birkenshaw.—The corner stone of a new Wesleyan Chapel was laid last week. The plans have been prepared by Messrs. Milnes and France, architects, Bradford. The style adopted is Italian, plain in character, and the dimensions of the chapel are: length, 60ft. width 45ft., with a height to the ceiling of 31½ft. Sittings will be found for 240 adults on the ground floor, and for 360 adults and children in the galleries. The interior woodwork, of Baltic red wood, with white deal panels, will be stained and varnished. The cost of the chapel will be £2400, exclusive of the land.

Belle Vue.—The Wesleyans of Belle Vue, near Wakefield, intend to erect a chapel and school, and, with this in view, they offered a premium for the best plan, and out of five sent in they have selected the one forwarded by Mr. W. Watson, architect, of Wakefield. The chapel will be 40ft. long by 31ft. wide, and the school-room 31ft. long, by 15ft. wide. The design is Gothic. The external facings will be red pressed bricks, relieved by white and blue bands and arches and stone dressings, the front gable coped with stone and having ornamented terminations and iron foliated finials. The cost of the building will be over £400. Mr. Watson has also been instructed to prepare designs for a chapel and schools at Eastmoor, which are to cost about £1200.

Worcestershire.—A new church dedicated to S. Philip, at Webheath, in the parish of Sardebigge, Worcestershire, was consecrated by the Lord Bishop of Worcester on Tuesday week last. The church, which has been erected through the liberality of the late Baroness Windsor, is from the designs of Mr. Preedy, architect, London, and is in the Early Decorated style of Gothic. The ground plan comprises a nave 60ft. long by 22ft. wide, chancel 25ft. long by 18ft. wide, a vestry on the north side, and porch on the south-west. The accommodation is for 200 adults and children. There is a stone bell gablet over the chancel arch. A suitable dwarf wall and iron railing, with entrance gates, encloses the site on three sides. The materials used are the local stone from the Hewell quarries, with Bath stone dressings, bands of red Finstal stone being introduced on the exterior, as also on the interior facing, which is of stone throughout. The roofs, which are open-timbered, are of red deal and pitch pine, boarded and covered with Staffordshire tiles. The font is of Painswick stone, with polished shafts of Irish green marble, and has an open oak cover. The pulpit and stairs on the north side of the nave are of English oak, with carved panels. The prayer desk, chancel seats, altar table, and rails, are of the same material, and the benches in the nave of stained deal. The windows are glazed with plain cathedral glass of two tints of green, with the exception of the east window, which is filled with stained glass, designed and executed by the architect, and contains the following subjects:—The centre light, the Crucifixion, having on either side types of the same—namely, setting up of the Brazen Serpent, and Abraham offering up Isaac. In tracery over centre light is Our Blessed Lord in session in his mediatorial office, with angels in side tracery. The passage spaces in the nave and chancel, and the porch floor, are laid with Godwin's tiles. The church is heated on the hot-water system by Mr. Vincent Skinner, of Bristol. The carving is the work of Mr. Boulton, of Cheltenham. Messrs. McCann and Everal were the contractors, and Mr. Smith, the clerk of works. A reredos, constructed for the most part of Carthagenian porphyrites, brought from Rome by the late Lord Plymouth, is in course of execution by Messrs. Burke, of Regent-street, London. The design consists of the above material, arranged in bands and patterns. There is a central cross in white marble, flanked on either side by panels containing angels bearing musical instruments, executed in glass mosaics on gold backgrounds. In the side compartments are the Alpha and Omega, and the sacred monograms incised in coloured cements on white alabaster.

Snodland.—On Tuesday, the 15th February, the parish church of All Saints', Snodland, Kent, was reopened for Divine service by the Lord Bishop of Rochester. The chancel has been restored after designs by Mr. A. W. Blomfield, and new roofs have been placed on the nave and side aisles. An excellent organ by Messrs. Bevington has likewise been erected in a chamber attached to the chancel. The tiled pavement by Maw is of a beautiful pattern, and a reredos of gold mosaic sets off the east end, which has been decorated by Messrs. Heaton and Butler, to great advantage. The font, hitherto smeared with white paint, consists of eight polished stone panels, surmounting a Purbeck marble base. A feature of some interest in the nave is a deeply-cut scene of the Crucifixion, on the second column, reckoning from the west, and fronting west. This has been carefully restored.

Talbot, Dorset.—On the 4th inst. a new church, dedicated to S. Mark, was opened at Talbot Village, Dorset. It has been built from designs by Messrs. Evans and Fletcher, of Wimborne. Throughout it is a massive and substantial building, in the Early Decorated style of architecture. The nave is 47ft. long by 21ft. in width, the chancel 15ft. by 21ft., and the tower 12ft. by 12ft. 9in., and 75ft. in height. The walls are of Purbeck stone, and the whole of the floors are laid with ornamental tiles. There are no rafters, and the roof, a very handsome open one, is of pitch pine. The chancel roof is more fully decorated with carving. The bracketed corbels have figures of angels, with the harp and the trumpet, on the north and south sides respectively. The capitals of the columns bear the design of the grape and passion-flower. The archway between the nave and the body of the church has columns of Devonshire marble, and there are marble columns at the eastern window. The pews, which are of pitch pine varnished, are of the modern open description, and movable. The pulpit will be partly of Devonshire marble, partly of Caen stone. The church will contain accommodation for between 300 and 400 persons, and will cost about £4500, the clock and bells £523.

Hessle.—All Saints Church, Hessle, near Hull, was re-opened on the 25th ult., after restoration and enlargement. The nave has been lengthened 26ft. to the eastward; the chancel pulled down and completely rebuilt, stone for stone; and the north and south aisles widened 16ft. The clerestory has been rebuilt, and the west doorway opened out. The roofs are of open timber work, varnished, and the existing nave pews will shortly be replaced by open benches of pitched pine. The three centre compartments of the reredos are filled with mosaic, by Salviati, and two painted windows have been placed in the south aisle, by Messrs. Hardman and Co. The thick coats of paint and whitewash, which lined the internal walls previous to the restoration, have been entirely removed by the use of a chemical solution, thereby avoiding the objectionable method of "tooling." The whole work has been carried out from the designs and under the superintendance of Mr. R. G. Smith, architect, Hull. Messrs. Simpson and Malone have been the builders, the other contractors being, for ironwork, Hart, Son, Peard and Co.; for painted glass, Hardman and Co.; for encaustic tiles, Maw and Co.; for church furniture, Messrs. Frank Smith and Co.; and for the heating apparatus, Messrs. Rimmington and Sons.

BUILDINGS.

Dock Extension.—A fine dock, in extension of the East and West India Company's system, was opened at Poplar on Saturday. It covers the area once occupied by the Old City Canal, and it makes the Isle of Dogs much more an island than ever it has been before. There are 33 acres of water in the new dock, and 4 pairs of gates, through which entrance can be obtained from either end. The main lock is unusually large, viz, 300 ft. long, 55ft. wide, and 30ft. depth at high tide, and it leads in the first place to a fine basin of six acres in extent. On the north, or export side, there is a mile and a quarter of quay frontage, with 16 jetties. The total length of quay is three miles. Warehouses of the most ample dimensions and of improved construction are built, or building; two of them for the storing of jute, and others for tea, coffee, rice, &c. A railway, bringing the dock into immediate connection with all parts of the country, will be laid down at once along the quay.

The Metropolitan District Railway.—The extension of this line along the Thames Embankment is rapidly progressing. From Westminster Bridge Station, eastward, a total length of about 6600ft. of side walls is complete, on which 2200ft. of upper arches are turned. Arching is also in progress for a further length of 3000ft. The walls are 7½ft. thick, and 25ft. apart. The walls of the booking office at Charing Cross are nearly constructed to their full height, and the roof of the station is being rapidly proceeded with. The contractors have employed at present, 2000 men, 2 locomotives, 250 horses, 280 trucks, 2 steam tugs, and 130 barges—the latter for conveying away the excavated material.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

P. O. O's. to be made payable to J. Passmore Edwards, at the Strand Office. All cheques to be crossed on the Union Bank.

Received.—J. H. and Son—J. M. Capes—Jos. Stewart—John Noble—J. H. B.—G. P.—R. G.—B. J.—E. D.—W. Batt—Robert Smith—M. and Q.—C. D.—Samuel Barnish—J. B. F.—W. D. D.—C. and T.—M. and B.—W. O. C.—M. M.—C. B. A.—E. P. M.—A. G. E.—J. D. G.—A Sapper and Miner—W. T.—J. H. M.—B. J.

R. S. T., Jun.—The sketches will probably appear.

Link Boy.—Not suitable for "Intercommunication."

W. Cave Thomas.—Thanks for programme.

W. D. Dobson.—We cannot speak precisely as to the time of the appearing of the sketch.

Clayeyarms and Blow Hard.—Replies too puerile.

W. Pullen.—Your question is an advertisement.

Surveyor.—Letter not authenticated.

Correspondence.

DR. ZERFFI AND THE HISTORICAL DEVELOPMENT OF ART.

(To the Editor of The Building News.)

Sir,—Will you permit to an outsider a few remarks on "Dr. Zerffi and the Historical Development of Art"? Your correspondent, in your issue of 4th March, in supporting Dr Zerffi's argument from the influence which the sea exercised in the development of Greece, quotes Goethe—"Perhaps it is the sight of the sea from youth upward, that gives English and Spanish poets such an advantage over those of inland countries," and adds, "Natural scenery is not the only, but it is probably the most important, motive in a nation's progress." Now it could not be "the sight of the sea from youth upward" that gave to the greatest of "English poets" "such an advantage over those of inland countries," for not only was he like his own Rosalind's uncle, "in his youth an inland man," but his life was almost wholly passed between Stratford and London; nor gave it any such advantage to the greatest poet of the other division of the island, although born by its beach. Shakespeare, in a patriotic passage in "King Richard II.," makes John of Gaunt speak of

——"the silver sea
Which sets in it the office of a wall,
Or as a moat defensive to a house."

and of

——"the triumphant sea,
Whose rocky shore beats back the envious siege
Of watery Neptune,"

but I do not know that he anywhere shows for it such an enthusiastic love and admiration as does Byron; and while Burns sings the beauties of the Doon, the Ayr, the Lugar, and the "streams around the castle of Montgomerie," I am not aware of a single poem in which his muse engages with the majesty of the sea. Your correspondent's quotation from Julius Charles Hare—"that the sea has been an essential condition in the civilising of nations, all history shows," is, although a more commonplace, a more sensible support of the argument of Dr. Zerffi. It amounts to simply this, that the sea, being the great highway between nations, is one of the principal means by which religion, literature, science, and art, are transported from one people to another. The Mediterranean gave an opportunity for a civilisation of some sort being ferried across from the Egyptians to the Greeks. The sea does not make up much in natural scenery, and although it did, I am not sure that natural scenery is among "the most important motives in a nation's progress." Although "God made the country, and man made the town," many of the most important motives may be found not amidst natural scenery at all, but in great cities. It is in great cities where mind meets mind, where

"enterprises of great pith and moment" are conceived and brought forth, where association carries out schemes by which individuals would be crushed, and where alike civilising inventions in the material, and reforms in the moral, social, and political world have chiefly their rise and prosecution. Dr. Johnson would not have exchanged the Strand for the Vale of Tempe. But what is the "motive of natural scenery" on those who are daily in its midst? For what poet or philosopher is the world indebted to the banks of Loch Lomond or the shores of Loch Ketturin? The Highlanders of Scotland are noted for their intense attachment to their native land; but, as Martineau says of the Alpine serfs, "they are attached, indeed, to their home, with the strong instincts of men cut off from much intercourse with their kind; and whose passions, wanting diffusion, acquire a local intensity; they therefore sigh in absence for their mountains as the Arab for his desert; but in them there is no sense of the glories amid which they live; and they wonder what the traveller comes to see." "The most important motives in a nation's progress" are, I suspect, something much beyond "natural scenery," however beautiful, or however sublime.—I am, Sir, &c. G.

SIR,—The "Writer of the Report" is wrathfully disposed towards me for exposing the Doctor's blunders, and says that I am "completely ignorant" of the subject. I can only say that I ought to know something of Painting, Sculpture, and Architecture, having been for many years engaged in the service of the Art Triad. The "Writer's" quotations are pretty, but have little bearing on the subject. I spoke of sculpture, not poetry, mental idiosyncrasy, &c. As, Sir, the errors in the Doctor's teaching are so flagrant, and the facts of some importance, I beg the favour of further space, in order to substantiate my statements by indisputable authorities. There is full justification, I think, for my being positive and plain in speaking of the subject, there being at the present time so much lecturing on art by persons not practically familiar with it. It is the blind leading the blind. The first false statement I will notice is that "the Jews were forbidden by law to carve or engrave." This, no doubt, refers to what Protestants term the second commandment of the Decalogue. The injunction, however, only prohibits the use of sculpture for idolatrous purposes. That it does not condemn it entirely and unreservedly is proved by the fact of the Temple, for which Divine guidance was directly given, being profusely decorated with the representation of natural objects. Solomon, too, who, as the wisest of men, may be supposed fully competent to decide on the meaning of this law, had his Palace, as we learn from Josephus, richly ornamented with the representations of "trees and all kinds of plants" carved in relief, also pictures. His throne, moreover, had on its steps figures of lions. Surely these are sufficient proofs of how the rule is to be understood. But it is worth while, perhaps, to consider for a moment what would be the result of such a rendering as the doctor seems to put upon it. As a moral commandment it would be equally obligatory on Christians as on Jews. Pictures, sculpture, illustrated books on science, natural history, philosophy, &c., all these would be so many gigantic sins. Illustrated periodicals (even THE BUILDING NEWS), though ministering in what is pure, useful, and entertaining in the innumerable wants and pleasures of our daily life, all must be sacrificed, as opposed to the Divine will. In short, it would needs be that civilisation must come to a standstill, or we should all be in danger of perdition.

To say that the Jews had "a horror of building" is simply a foolish and empty assertion, as also that they had no art. The ancient Jews did not certainly distinguish themselves in art as greatly as did other nations, and for a very sufficient reason. In other nations, architecture, sculpture, and painting were all developed and brought to excellence in the service of religion, the erection and fitting up of places of worship. But the Jews had no temple until Solomon's time, and but that one was allowed, so religion, with them, gave no stimulus to the fine arts. The art of building they certainly practised successfully. Their cities were fortified with walls, &c., which Josephus says "might be counted amongst the strongest," and their houses, we learn from many passages in Sacred history, were in the time of David of two stories in height, which marks an important advance in building. It is very unfair to the Jews asserting that their Temple was built by the Phœnicians. King Solomon was properly desirous of having the highest perfection in everything pertaining to the dwelling of the Most High, and had recourse to skilful foreigners to supplement native talent. Similarly, in the present day, we, when requiring a high class of decorative art, call in the aid of French and Germans. But would a future Dr. Zerffi, if acquainted with this fact, be therefore warranted in asserting that we had *no* art? And with respect to Hiram, the great master-mind in the erection of the temple, the *αρχος τεκτων* or chief worker, to this marvellous edifice, although he seems to have learnt his art, or, it may be, perfected it, amongst foreigners, yet we must remember that according to Josephus, Hiram was a Jew. That Jewish workmen were largely employed in the Temple work we know by the narrative in 1 Kings v. 13-18—"And King Solomon raised a levy out of all Israel; and the levy was thirty thousand men."—"And the king commanded and they brought great stones, costly stones, and hewed stones to lay the foundation of the house. And *Solomon's builders* (the italics are mine) and Hiram's builders did hew them, and the stone squarers, and so they prepared timber and stones to build the house." How well this work was done by the Jews, and much other of a difficult and remarkable character is attested by the late striking discoveries of the lower part of the Temple platform, and other still existing though now subterranean remains at Jerusalem, after a lapse of three thousand years.

Dr. Zerffi makes the strange assertion that Jews are "never picture painters." Now, if the Doctor knows so little about artists, how is he likely to know much about art? There *are* Jew painters, I beg to inform him. The remarkable genius of this gifted people shines as brightly in painting as in every other mental occupation. In proof, I need only mention such names as Winterhalter, Court painter; Bendeman, Director of the Dusseldorf Academy; Israely, of Antwerp; Oppenheim and Veit, of Frankfort; Magnus and Michael, of Berlin; Jacobs, of Paris; Levi, of Belgium; and, in England, S. Hart, Professor of Painting to the Royal Academy; the late Abraham Solomon and his surviving brother and sisters, all talented artists. There are as engravers, of the highest class, J. Gezv, and Gacoby, Professor of Engraving to the Vienna Academy; and as sculptors, Sussmann, of Berlin, and Viener, of the Royal Mint, Belgium. These names are but hastily gathered, or the list would be much longer.

It may be as well to remark, that two of the artists named are said to have changed their religion, though subsequent to their distinguishing themselves as painters. The others remain faithful to the faith of their forefathers.

Dr. Zerffi starts the fanciful hypothesis that Greek art owes its excellence to the influence of the sea. I beg to say there are other and much more readily demonstrable causes. There was the constant demand under a gross pantheistic religion for figures of the gods. There was the beauty and abundance of the best material, the Pentelic marble, and the immense advantage which sculptors then possessed of studying in the public games, &c., the nude figure. Moreover, the Greeks were an eminently handsome race. They had an unbounded esteem for personal beauty, and that beauty was not hampered and disfigured by their style of dress. That these were the reasons of the remarkable perfection of Greek sculpture may be argued from the fact that the converse of these conditions is assigned as the cause of the art not thriving with us in the present day.

Dr. Zerffi states that the Doric style "arose in the North" (wherever that may be). Standard writers agree in considering that it came from the South, its prototype being evident in the rock-cut tombs of Beni-Hassan on the banks of the Nile. His whole account of Grecian architecture is inaccurate. The Grecian Doric is not, as Dr. Zerffi states, essentially one of "massive simplicity." The style must be judged of by its most perfect specimens, and, as Fergusson says, the Doric must not be regarded as a merely masonic form. Sculpture was always used or intended to be used with it. The metopes between the triglyphs, the pediments of the porticoes, and the acroteria or pedestals on the roof are all unmeaning and useless, unless filled or surmounted with sculptured figures. Sculpture is, indeed, as essential a part of this order as the acanthus leaves and ornaments of the cornice are to the capitals and entablature of the Corinthian Order, and without it, or its place supplied by painting, we are merely looking at the dead skeleton, the mere framework of the order, without the flesh and blood that gave it life and purpose.

What the order in its complete perfection is we see in the temples of Theseus and Minerva Parthenos. Of the latter superb buildings it is stated ("Antiquities of Athens)":—"The decorations of this sumptuous edifice were of the richest and most perfect design and execution. Both pediments were charged with sculpture of unrivalled excellence. The metopes of the external entablature exhibited a succession of ninety-two groups in high relief; and the frieze which surrounded the cell and vestibule was adorned in its entire length of more than 500ft. by a representation of the Panathenaic procession." On the acroteria were sculptures, and the architrave seems to have had bronze ornaments, probably shields, attached to it. This is what Dr. Zerffi calls a simple style. What must his ornamental ones be?

Another of Dr. Zerffi's enigmatical theories is that "neither science nor art can flourish under a despotic priesthood." With regard to the latter part of the proposition (though no friend to priesthood), I cannot admit it to be true. It strikes me that exactly the reverse is the case. All history shows it. The architecture of Egypt, India, Classical Greece and Rome, and Mediæval Europe, were all developed under priestly rule—spiritual despotism. As faith dies out, or mental enlightenment weakens the priestly authority, the art creative power languishes and dies, one of the latest illustrations of this being the decadence of our native Gothic in the sixteenth century. Protestants are the only religionists free from priestly yoke, and markedly have no art of their own—have done nothing to advance art. In poverty of soul they are simply copyists and cribbers from ancient creeds. In conclusion, I must remark on the singularity of a History of Art making no reference to Rome and Western Europe.—I am, Sir, yours, &c.,

P. E. M.

THE DEVELOPMENT OF ARCHITECTURE

I.—ARCHITECTURE, CIVILISATION, AND ETHNOLOGY.

SIR,—Granted that architecture is a natural product of civilisation, for a refinement of building accompanies a refinement of manners, it follows that if we trace the gradual growth of civilisation we shall also see the development of art.

Civilisation may be defined as the outcome and application of the dormant energies of the human mind when two or three persistent varieties of mankind come to live in amicable competition among themselves, which induces each to emulate the better qualities of the other, and so become assimilated and raised above themselves—the abilities of one supplying the deficiencies of the other. Now that railways are dispelling prejudice by inducing people to see instead of hear and read about each other, this principle may extend itself to the whole world, which former times prevented by the insecurity and difficulties of intercourse, although the trading Phœnicians and road-making Romans were unconsciously hastening the results we see now going on with increased rapidity at the present day. We must also bear in mind the deep-rooted animosity that such a long seclusion had engendered, and lay some share of the blame to the physical features of the earth's surface, such as mountain ranges and land-surrounding waters (great barriers at one time), also that before the Christians the Buddhists were the only religionists known to history who cared to make proselytes of their fellow men, or treated them with equality. All the civilised communities of old entertained only a good opinion of themselves, and called their neighbours barbarians, and ever sought to conquer, enslave, or displace them to satisfy their pride or avarice. Nevertheless, it appears that the highest of these civilised communities have been produced by the gradual amalgamation and equalisation of the aborigines after a long period of servitude with the race who had overruled them by conquest—this by means of a middle class developed by their union. All the great historical nations of antiquity were undoubtedly combinations of races, and the names by which they are

known may be taken in each case to be that of the dominant ormostnumerous one, whose dialect they together spoke, raising it by joint effort to the dignity of a language; the dialect of the other would perish, except local names, and some few words for objects which were wanting. This process is going on now, but how many dialects have thus died out? Yet this admixture of race, however intimate, although it may modify each, never seems to have resulted in the production of a new type of man, embodying the excellencies of both. We may notice in England to-day, in the same family, nay, even among brothers, good examples of the three races who have made the English nation what it is. 1. The dark-haired man akin to the Iberian. 2. The red or sandy-haired Kelt and his Aryan congener. 3. The fair or brown-haired Teuton; each with their individual typical characteristics of mind. It seems doubtful whether the first will ever understand the self-control or practical purpose of the two latter; at the same time never will the Aryan fully appreciate the arts, though he may be useful in giving them a practical direction, thereby curbing the impulsive and exuberant imagination of the other which is the prime cause of his artistic power. Architecture to an Aryan alone would be the application of a science, to the former a display of his inherent art. Mr. Fergusson's most interesting chapter on Ethnology in his great work, deserves to be most attentively considered, but he has not pointed out that architecture arose among communities composed in themselves of different races.

Language, like architecture, is a consequent of civilisation, being the refinement and extension of the dialect of the more energetic of the races by their combined action. The age of nomadic tribes was a dialectic period; national organisation produced language as it did literature, science, and art. Science and art are already to a certain extent cosmopolitan, but literature must remain national until languages have died out before one speech which shall make "the whole world kin"; when there shall be an architecture without styles, and art without affected conventionalisms.

Mr. Fergusson considers that the Kelts—a—misnomer for the dark pre-Aryans—are to be identified as great builders naturally, or as having an innate genius which only required to be brought out by circumstances; that the Turanians—if not the same—as having an innate power of combining colours, and the Aryans as being great organisers, and besides, directors of the abilities of the others to useful purposes, and it is more than probable that we owe wooden construction to them, as well as the introduction and use of metals. Setting aside physiology—however paramount it should be in the study of ethnology alone—monuments and idolatry are everywhere tests of the presence of the pre-Aryan, as political organisation and inflectional language are of the Aryan. Wherever these races have intermixed, the results have been progressive arts, restrained idolatry, an enriched inflectional language, political administration, a mental activity, and moral tone engendered, and a brilliant civilisation in consequence. Not permanent, however, for the Aryan influence seems to die out after the effort, leaving the pre-Aryans either to remain *in statu quo* for ever, or unable to govern themselves—even to relapse into their original condition. It seems probable that we can even estimate the amount of Aryanisation in every case by carefully studying the history of nations. Greece we may safely cite as the only example of these two types combined in such proportion as to produce excellence in almost every feature. The English, as the Romans were, are modified Aryans; the French, modified pre-Aryans; were they to combine, a civilisation might yet be the consequence as brilliant as that of Greece. A contrast between these two nations as they are is exemplified by the character of the monuments in their cemeteries, and beautiful designs are to be found in a French professional sketch-book, too expressive to be carried out perhaps, but which resemble on a small scale the tomb of Cyrus, or even Birs Nimroud (as restored in Mr. Fergusson's book). We, on the other hand, preferring a modest slab to mark the sacred spot, endow a scholarship or professorship, to commemorate the worthy dead—these very different from the obligatory foundations of the Middle Ages for the welfare of the soul. There is, however, in England, a very notable exception to this yet unfinished, which certainly does not represent the national mind, which by Milton was said of our great poet:—

What need my Shakespeare for his honour'd bones
The labour of an age in piled stones,
Or that his hallow'd reliques should be hid
Under a starry-pointing pyramid.

Would these lines ever have been written had there not been those who indulged in the vanity of "storied urns?" Yet what is more satisfactory as a memorial than the simple recumbent effigies of the best period of Christian art in England (13th century), especially when compared to those monstrosities that encumber Westminster Abbey; perpetrations of the unbridled imagination when mental vigour was directed another way.

Do we know anything of these Turanian or pre-Aryan races before the Aryans came in contact with them? Only this much, that, in the Stone Age, they occupied the whole of Europe, (?) Russia, Northern Africa and Southern Asia, as their remarkable megalithic monuments and interments prove. These monuments (kistvaens and dolmens), in their simplest and rudest form consist of a few huge unshaped stones forming a chamber by acting as walls and roof; their use is still uncertain, although it is more than probable they were houses as well as tombs; they are generally found buried by a mound thrown up over them. In time they were better built, with chosen flat and square or oblong blocks; sometimes one of the wall slabs had a round hole cut through it. Was this stone added when the house came to be closed up as a tomb for its inmate, for one side is sometimes still found open?

Then the plan became more complex, several cells were grouped together, and a passage constructed extending to the edge of the mound. There are also the circles of upright stones (cromlechs), formerly attributed to the Druids, and equally of uncertain purpose, but sometimes found surrounding a chambered tumulus. But to return to the chambers themselves. We shall be able to trace modifications and improvements in their structure which seem to point out the period of the first contact of their builders with the intrusive Aryans, bronze implements being found and better pottery. The walls, previously of upright slabs, came to be built with stones in layers; the roof, still formed with slabs, naturally restricted the size of the cell; afterwards it was found that height could be got by continuing the walls up and making them converge by over-sailing the courses until the space was thus spanned; last came a circular plan, and with it a rough dome thus constructed. There are numerous specimens of these "bee-hive huts" either above ground or within mounds in the British Isles and elsewhere, and they have quite recently been discovered in great numbers in the now sterile valleys around Mount Sinai, by Capt. Wilson, R.E. The round chambers, at first small, grew in size, for this construction was soon found capable of covering a considerable space (Maeshow, in Orkney, and New Grange, in Ireland, are specimens of attempts on a larger scale), eventuating in the grand and most finished example, the so-called "Treasury of Atreus" at Mykene, in Greece, where the square over-sailing stones have been worked to a curved surface, and probably even covered with plates of bronze. The remarkable low tower-like structures found in Sardinia, containing a domed chamber thus built, and called Nuraghes by the inhabitants, should be compared; but who will deny that these are the germs of the circular temples, such as the Pantheon, at Rome (encased in the time of Agrippa), whence the round domical churches, and even the word "Church" itself? The development of the arch from the lintel is perfectly analogous to that of the dome from the roof slab, and there is but one more improvement for both—the radiating joints or beds.

The Bronze Age was a period of increased activity. The Aryans were on all sides forcing themselves among the old dark races, and the active Phœnicians, who were undoubtedly allied to the former, although they spoke a Semitic dialect, were busily flitting about and turning up everywhere, being the only wayfarers of the open sea, bartering Egyptian beads and bronze ornaments for tin, copper, gold, silver, and amber; this at the very dawn of history, when, however, Egypt, at least yet free from priestcraft, was in the days of her progressive vigour. Much we owe to the Phœnicians, but they were *only carriers;* their settlements were only storehouses, generally on islands—but these sometimes becoming great centres of trade, grew into towns, and even cities, as Carthage. Such a structure as the curious megalithic temple at Malta, and the general improvement and finish of Stonehenge, seemed to be explained by the intercourse of the natives with the Phœnician colonists.

The primitive Aryans of Asia Minor built houses of wood, prototypes of Hellenic temples which the pre-Aryans of the country first copied as tombs in the living rock, and afterwards, when they had intermixed, these were *built as temples,* one giving them a character more appropriate to the new material, and proportion; the other, graceful ornament, and, at last, the most wondrous sculpture. The same process seems to have originated the lithic architectures of Egypt and India long previously, but Assyria and old Persia, more Aryan, retained its wood construction almost to the end.

One thing seems certain, that to have a correct idea of the origin and development of architecture, we should study and compare its remains in all countries, and trace the complicated structures to their simplest forms. The combination of the two great types of mankind took place at different times in different places, and under varying circumstances. Egypt seems to have been the first ground, but if we do not find here the incipient forms, there is evidence that they must have been similar to those primitive erections which in other countries have fortunately been preserved to our day. Are there not tribes still in their Stone Age, who help us to form some idea of the original condition of our own ancestors?—I am, &c.,

A. G. Ellis.

"GOSSIP FROM GLASGOW."

Sir,—I regret to find in my latest sent "Gossip" an awkward mistake. By some misconception of my meaning the quotation from Shakespeare—

"Men's evil manners live in brass; their virtues
We write in water"—

is printed in connection with my slight notice of the merits of the late Mr. Henderson, instead of with that which follows—a paragraph about a public fountain in memory of a deceased Lord-Provost. The "copper-plate" and "aquagraphy" of the context show the real relationship of the quotation. I see also that in my remarks on municipal extension "average" has been printed for *acreage.*—I am, &c.,

Your Glasgow Correspondent.

PROTESTANTISM AND THE CONVENTIONAL CHURCH TYPE.

Sir,—I am sorry that I have only just read your last article on this subject, but trust that at this late hour you will publish what I have to say. I don't wish to insult you to such an extent as to call you what is now termed "*low*" Church, but I must say that my fond hope that you were *Church* has received a fearful shock from what you say in your note about "semi-Catholic ritual." What I want to say is, that you appear to have entirely overlooked two churches which, with my small knowledge of modern churches, have come under my notice, in which the side aisles are used simply as passages, so that the congregations are so placed that nearly all—if not *all*—can see both altar and preacher—viz., S. Columba, by Mr. Brooks, and All Saints, Clifton, by Mr. Street.

These churches are intended for high ritualistic services. All Saints is not yet finished. From the small knowledge I have of the subject you treat of, I should think that if we want to see churches built for *the people,* in which they can see both altar and preacher, and can worship with comfort and convenience, and without detriment to their health, we must go to the churches built by the people called "High Church."—I am, &c. J. W. Alexander.

ART COMPETITION—SOCIETY OF ARTS.

Sir,—I was much surprised, in looking over The Building News of the week before last, at finding that the champagne glasses which I sent to the Society of Arts for competition for prizes were described as being "without filigree." Surely there is a mistake here, as all the three glasses are in the highest sense filigree, after the pure Venetian style.

In the delicate green one I have put a double thread of enamel so fine that I can find nothing in the Kensington Museum equal to it. I did this to show that in delicate manipulation of filigree the British workman is not inferior to that of Venice. The other glasses are both done with a single thread of different colours. I trust you will see this is corrected.—I am, &c., Joseph Leicester.

13, Tenison-street, York-road, Lambeth,
March 6, 1870.

THE MANX COMPETITION.

Sir,—Seeing by your columns that the Manx government have rescinded their former decision with regard to the plans sent in by request, for the proposed local Houses of Parliament—although, so far as I understand, they were bound to employ the author of the "best plan" sent in—may I ask if it is the intention of Mr. Ellison (who is proved to have done so) to test the legality of this decision? It certainly ought to be done in the interests of our profession; but he should not be left to stand the risk which would be run in taking the necessary steps. Allow me to suggest that your professional readers (whose battle, after all, it is) place in your hands, should the necessity arise any sum they like towards the necessary expenses. This I will gladly do. Trusting this matter will be taken in hand before it is too late,—I am, &c.,

An Architect.

Intercommunication.

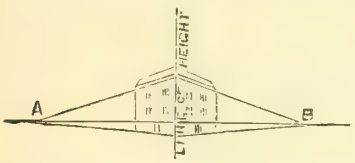
QUESTIONS.

[1794.]—REMUNERATION.—Could any of the readers of THE BUILDING NEWS inform me what would be a fair remuneration to be paid to a person for introducing a young man as an improver into an engineer's office, the young man agreeing to give up, say, 12 months of his time?—T.

[1795.]—A NOVEL QUESTION.—Can any correspondent inform me the best way for a young accountant and architect's clerk to earn his passage to and from America?—RICHD. MASTERS.

[1796.]—POLISHING PINE FLOORS.—What is the best method of polishing pine floors?—INQUIRER.

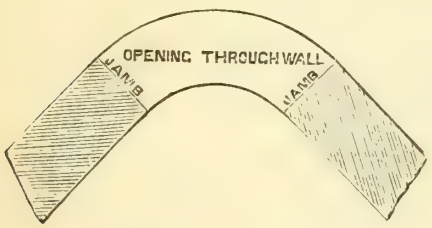
[1797.]—DIMINISHING POINTS.—Could any of your readers inform me if there is any rule to get the diminishing



points A B in a perspective, thus? If so, a description of the rule will oblige—PUPIL, M.

[1798.]—NICOLL'S PATENT.—There is a Nicoll 's patent for cheap construction. Can you, or any of your readers oblige with patentee's address?—X. Y. Z.

[1799.]—SOFFIT OF ARCH.—I should feel much obliged if any of your numerous correspondents could describe the method for drawing the sketch outline for the soffit of a semi-circular arch cutting through a circular wall, the plan



of which is a quadrant. The jambs will not be parallel, but at right angles as shown in the annexed sketch.—INQUIRER

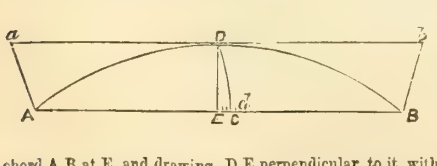
[1800.]—MOUNT SORREL GRANITE.—Can any of your correspondents inform me where Mount Sorrel granite comes from, and for what purposes it is generally used?—STUDENT.

[1801.]—VELOCITY OF WATER.—Required the velocity of water issuing from a pipe 6″ diameter, 4 miles long, with a head of 30ft.—G. P.

[1802.]—VARIOUS QUESTIONS.—Can any of your numerous correspondents give me any information with regard to the following?:—1. What is the rule for obtaining best form of wooden beam out of a round piece of timber? and what proportion should "width" bear to "depth" for strongest section? 2. What, briefly, is the difference between a lime and a "cement?" 3. What should be the projection of footings with regard to height in factory chimneys, and what is the proper diminution of the shaft?—X. T. C.

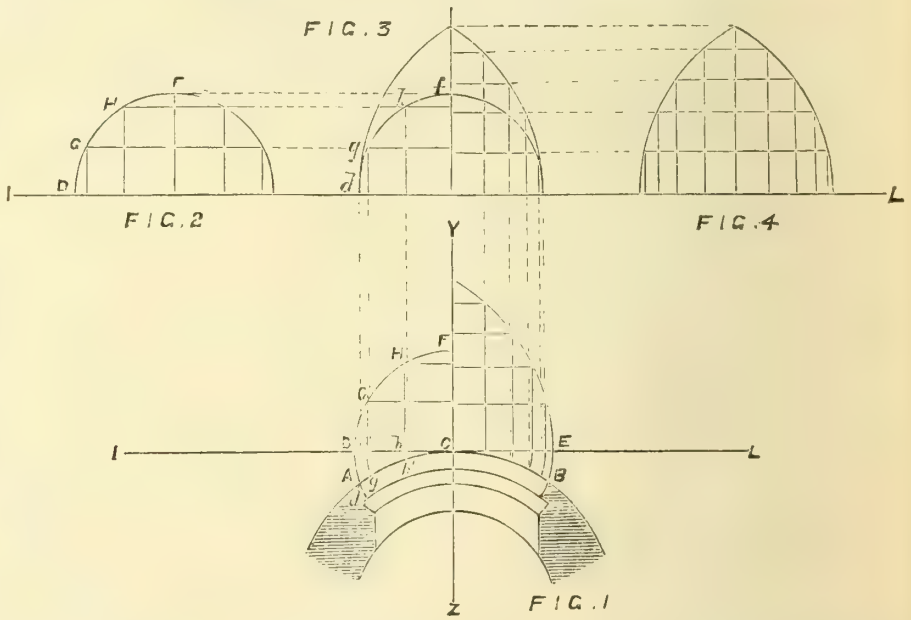
REPLIES.

[1779.]—UNANSWERED QUERY—ARCH UPON ARCH. It does not seem to me that "Young Stonemason" has been much benefited by the two answers given to his query in THE BUILDING NEWS of February 25th. "W. R. A., Uckfield," notwithstanding his sneer at "Sandysarms," a few lines further up the column, does not appear to have so successfully studied his books as to give a lucid demonstration to the problem that he has attempted to solve. It is so obscure that it will take a Philadelphia lawyer to see through it. "Draughtsman," too, will find that the fixing the compasses at B, and transferring by arcs the seats of the ordinates from A B C to the straight line G H drawn at right angles to the diameter of the cylinder will not give the flattened elevation. The development of the curve should be got by the ordinary method of stepping with the compasses, which is the easiest and quickest way, or by the following manner:—Bisect the



chord A B at E, and drawing D E perpendicular to it, with radius A D and centre A describe the arc D *c*. Divide E *c* into three equal parts, and set off *c d* equal to one of these parts, then A *d* is equal to half the length of the arc A D B. Hence if *a* D *b* be made equal to twice A *d* it will be the development of the arc A D B. Would "Young Stonemason" say if it is the method of finding the lines for the construction of a stone arch in a circular wall that he wishes to have?—W. J. P.

[1779.]—UNANSWERED QUERY.—About twelve months ago, I fell into the same predicament as described in THE BUILDING NEWS of December 31st by "Young Stonemason." I was asked to make a drawing of a window which was circular on plan and arched in elevation, to correspond with other windows in the same building. I tried, and failed; I was so chagrined at the result that I determined to solve what was termed at the time "a puzzler," so I looked through one or two works on orthographic projection, but I could not find anything near a solution of the "puzzler," so I set to work to solve the problem, and after several ineffectual attempts at solution, I found out the following method, which I believe to be correct. On inspection of the accompanying illustration, it will be better understood than any description I can give; but the following attempt at description may be found acceptable. Let A B, Fig. 1, be the circular plan of a window, and C the centre; through C draw the intersecting line I L tangent to or at right angles with the radius C Z; upon I L and C as centre with the radius C D describe the quadrant C D F, equal the height and width of the proposed arch; divide the quadrant into any number of equal parts, as D G, G H, and H F, let fall the vertical lines F C, H *h*, and G *g*, until they cut the intersecting line I L in the points C *h* and *g*; then from C as centre describe the arcs from the points D *g* and *h* until they cut the circumfere nce A B C in the points *h' g'* and *d*; then from the points thus obtained draw vertical lines of an indefinite length. The projection is thus obtained: draw the intersecting line I L, upon I L construct the arch of the necessary height and width as shown in Fig. 2, and divide the circumference into the *same number* of equal parts as was done by the quadrant in Fig. 1; then from the points D G H F draw the horizontal parallel lines until they intersect the vertical lines drawn from plan Fig. 1 in the points *d g h* and *f*, and through these points draw the line *f h g d* by hand or by the use of French curves; then *f h g d* will be the projection of "an arch upon circle." I have also shown the method of obtaining a Gothic arch based upon a circle on the other side of the vertical line Y Z, which needs no further description, as the foregoing description will answer for this also. On referring to THE BUILDING NEWS of July 2nd, 1869, I see a similar question was asked by "Labyrinth." Will some of your better informed readers say whether the above method is correct or not? If correct, could they tell me in what work the same or a similar method is described? If not correct, can they give one that is, and oblige "Labyrinth," "Young Stonemason," and—ROCHDALE?



[1782.]—ECHO.—"Inquirer" wishes to destroy echo. Let him set the sacking on upper part of wall A diagonally, as on plan, instead of flat, as at present. He will then most likely be able to dispense with the sacking hung from principals, which is positively hurtful, as it destroys the resonance, a very different thing from the echo which troubles him. Let him experiment with the pitch of the planes of the canvas faces till he gets the most suitable angle.—F. W. L, Belfast.

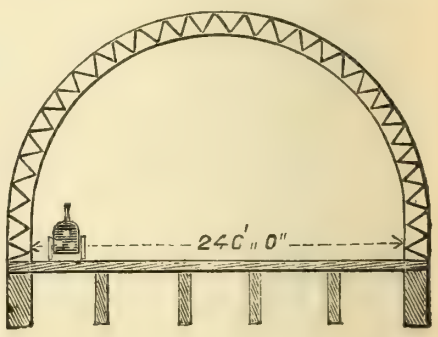
[1785.]—DRAINAGE.—If your correspondent "A Subscriber" will turn to the paragraphs "Water Supply and Sanitary Matters," in THE BUILDING NEWS of February 25th, and read the few lines under the head "The Lea River," he will see that it is *not* desirable to construct a sewer to drain into a stream. Referring to his sketch, the whole question resolves itself into this:—Is there fall enough to construct the sewer? If the level of the water in the stream is above the level of the invert of the culvert, it cannot be done. There may be room for a pipe between the water level and the level of the house if a pipe drain would be large enough for the purpose. "A Subscriber" had better take professional advice.—C. E.

[1788.]—LONDON UNIVERSITY.—There are no courses of lectures on any subject whatever in this university. When will the public learn to distinguish between the University of London and University College? The two institutions are perfectly distinct. The former consists of a Senate and Council, and has power to confer degrees in arts, sciences, medicine, law, &c.; the latter is a large public college, with school attached, similar to King's College. Presuming that information is required respecting the courses of lectures on architecture at University College, I submit the following:—Four courses are delivered annually by Professor T. Hayter Lewis, viz., two on "Architecture as a Fine Art," and two on "Construction." In each of these subjects the lectures are divided into a first and second year's course, but the whole of the lectures may be attended in one year. These lectures are delivered in the evening. At King's College, London, lectures on Construction are annually delivered by Professor Kerr. At Cambridge University, a course of lectures on Architecture is now being delivered by Sir M. Digby Wyatt, but this course is, I believe, only open to students of the University.—R. L. B.

[1789.]—MAPPING.—Apply at Spon's, 48, Charing-cross. The cost would be about 5s., although there are books of the class running to considerably higher figures.—S. P. C.

[1790.]—ROOF OF MIDLAND STATION.—I would advise "Student" to refer to the account given of the discussion on the Great Northern Terminus, King's Cross, at the Civil and Mechanical Engineers' Society, in your journal of Feb. 11 and Feb. 25. He will find the information he requires about the New Midland Station fully explained in Mr. Arthur Thomas Walmisley's account of this, among other roofs.—G. SMITH.

[1790.]—ROOF OF THE NEW MIDLAND STATION.—The roof exerts no lateral thrust on the side walls, for the simple reason that the thrust is taken by girders running right underneath the station from side to side, as shown in



the sketch annexed. The girders, which are of wrought iron, are supported on pillars, and the space below is utilised for cellars and purposes of storage. These girders tie the feet of the roof principals together, and so prevent any lateral thrust in the direction of the outer or convex side of the roof.—CONSTRUCTOR.

WATER SUPPLY AND SANITARY MATTERS.

LEITH.—The Leith local authorities are about to institute measures to prohibit the occupation of underground dwellings in the burgh. On Friday week, at a meeting of the Public Health Committee, it was resolved that notice to quit, under the provisions of the Public Health (Scotland) Act, should be served upon all occupiers of houses which are less than one-third of their height above the level of any street or ground adjoining, or have not 8ft. at least of their height from the floor to the ceiling, with an open area of 2ft. 6in. wide from the level of the floor. Mr. Archer, sanitary inspector, was instructed by the committee to prepare a report containing a list of all premises within the burgh which, in the meaning of the Artisans and Labourers' Act, are in a dangerous condition and unfit for human habitation.

THE SUBSOIL DRAINAGE OF NEW BROMLEY.—Mr. Harrison, engineer, recently visited Bromley for the purpose of

advising the local board as to the best system to be adopted in the subsoil drainage of New Bromley. Mr. Harrison advised that the whole of the water should be taken into the existing town drain, near the Market-square, and so discharged into a large pond at the back of the town.

The Supply of Water to the City.—At a meeting of the Court of Common Council, on the 24th ult, it was resolved, "That it is desirable the question of the supply of water to the inhabitants of this City should be seriously considered by this Court, and that, having regard to the Report of the Royal Commission, the whole subject be referred to a committee for them to inquire and report forthwith to this Court as to whether it will be to the advantage of the public that the interests of the existing water companies should be purchased, and that the subsequent management should be vested in this corporation."

South London Water Supply.—Dr. Bristowe, in his report to the Camberwell Vestry, quoted the analysis of the waters for January, by Dr. Bernays, as follows:—"Kent Company, total solids, 28·28grs per gallon, of which 1·96 consisted of organic matter; the water was bright and clear and in no sense objectionable. It contained but few nitrates, and the organic matter was vegetable and uninjurious. Southwark and Vauxhall: Total solids, 21·28grs. per gallon, of which 28 consisted of organic matter; the water was nearly clear, but required filtering. It contained above the average impurity. Nitrates were more than usually distinct. Lambeth Company: Total solids, 21·84grs. per gallon, of which 2·12 consisted of organic matter. The water was turbid and required filtering. Nitrates were more than usually distinct."

STAINED GLASS.

New Painted Window in Bishopsgate Church.—By the liberality of a parishioner, a new east window has been recently erected in Bishopsgate church. The design was by Mr. Moody, of the South Kensington Museum, and it was executed by Messrs. Powell, of Whitefriars. The west window, the gift of the same parishioner, was designed and executed by the same artist and manufacturers. The subject of the east window is the Crucifixion, treated in part conventionally, and some ideal figures are introduced to make the representation of the sacred scene harmonise with the architectural ornamentation necessary for the style of the church.

Guildhall.—The Corporation of the City of London have within the last few days agreed upon the form which the proposed memorial of the late Prince Consort shall take. It will be remembered that a considerable sum of money was voted for that purpose, and it has now been settled by the City Lands Committee that a large west window in the Guildhall, above the gallery, shall be filled with stained glass in a handsome and elaborate design. Twenty designs were sent into the City Lands Committee for the royal memorial, but that selected is the work of Messrs. Ward and Hughes, of Frith-street, Soho. The preliminary masonry work has been commenced, and it is believed that the window will be finished in a few months, certainly before the next banquet on Lord Mayor's Day.

LAND AND BUILDING SOCIETIES.

Edinburgh Workmen's Houses Improvement Company (Limited.)—The eighth annual general meeting of this company was held this week. The report stated that the directors had pleasure in submitting to the shareholders a report and balance sheet, which was, on the whole, satisfactory. The net revenue arising from the rental of the houses enabled them to maintain the dividend of 5 per cent., and to add a further sum of £68 12s. 9½d. to the reserve fund Although the houses built by the company at Dumbiedykes are at present all occupied, the report stated that the great extent to which building has recently been carried on in the neighbourhood of the company's buildings and elsewhere has had an appreciable effect on the letting of the houses. Several of them stood vacant during the first and second quarters after Whitsunday, and one was vacant for three quarters. It was to be observed that there continued a great demand for the lower rented houses, and that it was only the houses of the highest rents (£12 a year) that there was any difficulty in letting. The total loss arising from vacant houses during the past year amounted to £58 19s. The directors were gratified to state that there had been no loss from irrecoverable rents, and the arrears at the close of the account amounted to only £8 10s. on a rental of upwards of £1300. The report was unanimously adopted.

East Surrey Permanent Building Society.—The annual meeting of the members of this society was held on Tuesday week, at Bermondsey. The directors' report stated that the board, after providing for all liabilities, had been enabled to declare a bonus of 1s. 4d. in the pound. The report was unanimously received and adopted.

City and Suburban Permanent Benefit Building and Investment Society.—The fourth annual report of the City and Suburban Permanent Benefit Building and Investment Society, presented at the meeting held at the London Tavern, on the 23rd ult, stated that not only has the success of the society been satisfactory during the past year, but it has in reality made an advance in its transactions, as will be seen by reference to the last balance-sheet, where the receipts are £13,371 16s. 10d., and in this year's balance sheet the receipts are £15,102 15s. Out of the profit of the year, including the balance of profit brought forward from last year, the directors have placed 5 per cent. interest to the credit of all investment shares and deposits, and after carefully investigating the whole of the liabilities of the society, they have declared a bonus of 2½ per cent. upon all investment shares, thus making with the interest a dividend of 7½ per cent. for the year. The assets of the society amount to £19,856 16s. 3d.

The Eighth Working Man's Building Society.—The first annual meeting of this society was held at Sunderland recently. Mr. J. W. Campbell, the secretary, read the balance sheet, from which it appeared that £20,935 had been advanced on mortgage during the past year on 171 houses scattered over all the north of England, £1665 more was passed at the close of the year, but waiting for deeds being prepared, and that the total advances for 13 months had amounted to £22,600. The total income for 12 months is set down at £22,499, and the shares in force at 998¾. The actual net profit, after payment of every expense and without anticipating any future profits or arrears thereof, amounted to 16½ per cent. per annum to borrowers as well as investors.

London and Westminster Land, Building and Investment Society.—The balance-sheet of this society, for the twelve months ending December 31, shows the income to have been £61,546 5s. 8d.; the expenditure, £59,935 8s. 5d.; and the balance in hand and at the bank, £2,010 17s. 3d. The profit and loss account shows a balance of £5,179 19s. 3d.

London and General Building Society.—At the fourth annual meeting of this society, held recently at the offices, 337, Strand, the chairman, Mr. Thomas Hughes, M.P., presiding. The report read by Mr. W. R. Selway, the managing director, stated that the number of shareholders had increased during the year from 769 to 1010; the total number of shares subscribed for was 4144. The income of the society from all sources was £39,310, including £24,891 from subscribing members and depositors alone. The securities taken by the trustees, consisting of freehold or leasehold lands and houses, were in the aggregate £48,860. The amount of profit in addition to that brought from last year is £3490, out of which the Board had apportioned 7½ per cent. to all investing shareholders, leaving a large surplus to be carried to a contingent fund. Mr. Thomas Hughes and the Earl of Lichfield had been elected trustees in the room of the Right Hon. A. H. Layard and Viscount Milton, resigned. The report was, on the motion of the chairman, unanimously adopted.

British Land Company.—The directors, in their last half-yearly report, announce that the sales of land during the past year have amounted to £143,959, being £67,678 less than in the previous year. Having regard to the smaller amount of land sold, as well as to the promise made at the last annual meeting that the debt of the company should be reduced, the directors have to a great extent refrained from making new purchases, and only three estates have been purchased during the year, viz., George-lane Station, Woodford, a further portion adjoining the estate at Kingston, and Walthamstow (No. 9). The remaining portions of the following estates have been sold, viz., Bedford (No. 2), Bushey (No. 2), Gosport, Leyton (No. 2), Ramsgate (No. 2), Stamford-hill, and Waltham Cross (No. 2); also the Barnet waterworks. After paying the interim dividend at 5 per cent., amounting to £7750, the balance sheet shows a profit of £23,708, and out of this sum the directors recommend a further dividend of 5 per cent., and a bonus of 5 per cent., free of income tax, making £15 per cent. for the year, which will take £18,875, leaving a balance of £4833 to be carried forward to the next year. In accordance with the resolution passed at the last annual meeting, 30,000 new shares have been issued, of which 29,389 were taken by the shareholders in respect of their existing shares, and the remaining 611 were offered by tender, and allotted to the highest bidders at premiums amounting to £1442. The deposit of £1 and first call of £1 a share, amounting to £60,000 have been paid, and £19,463 in advance of calls not yet due, and the debt of the Company is now £29,000 within the borrowing powers.

Driffield and East Riding Benefit Building Society.—The fifth annual report of the executive committee of this society is of a very encouraging nature. Within the past year 155 9-10ths ordinary shares have been taken, and 80½ have been withdrawn, leaving 543½ ordinary unadvanced shares in progress. In deposit shares there has been an increase over the previous year, and the balance due on such shares is £3,600. £2375 has been advanced on mortgage securities; and £650 has been advanced on mortgage to non-members as surplus fund investments, at £5 per cent. interest. The balance now remaining due upon advances of shares is £7535 12s. 5d., and upon advances of surplus funds £2150, making a total of £9685 12s. 5d. The profits of the year, after providing for all expenses of management, have enabled the executive committee to place to the credit of ordinary unadvanced shares interest at the rate of £8 per cent., and to carry £17 3s. 5d. to the reserve fund, increasing that fund to £158 11s. 3d.

LEGAL INTELLIGENCE.

Slaters' Work.—Hussey v. Prout.—This was an action brought in the Bloomsbury County Court, before G. Lake Russell, Esq., Judge, originally in July last, by the plaintiff, for work done as a slater; the price was not disputed, but the amount of work done was, and the case was adjourned for arbitration. Mr. Brown, of Lissongrove, builder, was appointed arbitrator by the defendant; the award of Mr. Brown was not satisfactory, and a new trial was applied for and obtained. Mr. Wood, barrister, appeared for the plaintiff, and Mr. Pain for the defendant. Mr. Wood, in opening the case, strongly condemned the way in which the plaintiff had been treated. The plaintiff and a number of witnesses were examined, and proved that the price charged of 3s. 9d. per square yard was fair and reasonable, and that 106 squares had been done. Mr. Brown was also examined, and admitted that he did not go to measure the work, but had taken the measurement from the plan. He did not make nearly so much as the plaintiff. Mr. Prout, the defendant, considered that 3s. 6d. per square was sufficient. His Honour said, after hearing the evidence, he could not understand how Mr. Brown could have made the award he did, and he gave judgment for the plaintiff for £5 10s. and costs.

Liability of Local Boards for Highway Repairs.—Judgment was given in the Court of Queen's Bench last week in an action against the Preston Local Board, which involved the liability of local boards to repair footways. Their lordships decided upon the general principle that no action could be taken at common law for a highway repair.

The Sewage Nuisance. — Attorney-General v. The Local Board of Bishop's Stortford.—This was a bill and information filed by the Attorney-General, at the relation of Mr. Richard Hunt, against the Local Board for the district of Bishop's Stortford, asking for an injunction to restrain the defendants from permitting any of the sewage of the town or district of Bishop's Stortford, or any water polluted with sewage or other noxious or offensive matter, to pass into the river Stort, through any of the sewers, drains, or channels under the control of the Local Board, in such a manner as to render the water of the river near the plaintiff's mill unfit for use by the plaintiff or his lessees, or a nuisance to or injurious to the health of the persons resident at the mill or in its vicinity. The bill stated that in the year 1867 the inhabitants of the town of Bishop's Stortford resolved to place the town under the operation of the Public Health Act, 11 and 12 of the Queen, chap. 63, and, accordingly, an application was made to Her Majesty in Council, and an order was made on the 9th of February, 1867, that the Public Health Acts should be put in force in the town. Prior to the date of that order the Highway Board for the district had acted as a Local Board, but after that date the defendants were constituted a Local Board under the provisions of the Acts. It was stated that the defendants then proceeded to carry out a regular system of drainage for the whole of the district. The consequence of their proceedings, according to the bill, had been the creation of a nuisance. Affidavits were filed by the plaintiff and by other persons in support of the case made by the bill, and evidence was also given for the defendants, by which it appeared that they had made no alteration whatever in the sewers, and that no increase of sewage had been passed into the river; that the water was as pure now as it had been for many years, and that fish were plentifully caught at the present time. This bill was filed and an injunction applied for in July, 1868, but the motion was allowed by the plaintiff to stand over, and the cause only now came to a hearing. It was further stated that an Act of Parliament had been passed, which would come into operation on the 1st of July next, by which it was provided that no cesspools should be allowed to drain into the river Stort, and, consequently, that the granting an injunction now would be totally useless. The Vice-Chancellor said this was an information and bill, the bill being founded on the individual injury alleged to have been done to the plaintiff, and the information being founded on the injury alleged to have been caused to the public generally by the nuisance. The plaintiff was the owner of a mill in Bishop's Stortford, which was let at a rental of £100 a year, and was occupied by a tenant named John Lawrence. The plaintiff himself lived some distance from the town, and had no interest in the place except the rent he derived from the mill. The only injury, therefore, which he could sustain was in the loss of his tenant, who, he alleged, would leave the mill if the nuisance were not done away with, or in the reduction of his rent. The tenant had been cross-examined in court, and it appeared from his statements that he had first become tenant of the mill in 1865, and, after residing there for a year, he had taken a lease for 12 years, so that there were several years of the lease unexpired. Lawrence said he had been in ill health occasionally, but he did not state that it was caused by the smell from the river, and he did not state that he had ever applied to have his rent lowered. The plaintiff in his affidavit said he had received many complaints in writing from the inhabitants of houses in the neighbourhood, but none of these written communications were produced; and the conclusion he came to was that such complaints were never made. As regarded the health of the town, the plaintiff was not personally interested in the question, and in his Honour's opinion there was no case of private injury which would justify him in interfering. When the bill was first projected the case was rested entirely upon private injury, but subsequently the plaintiff, in order to strengthen his case, had obtained the sanction of the Attorney-General to the information being filed on public grounds. That sanction was obtained, as was usual in such cases, upon an *ex parte* statement, and now the question was what injury was caused to the public by the conduct of the defendants? The bill charged that they had caused all the cesspools of the town to be drained into the river, that the sewage matter was deposited along the banks, and the unwholesome and offensive effluvia arising therefrom created an intolerable nuisance most prejudical to the health of all persons residing in the neighbourhood; that the fish in the river, which were previously abundant, had been entirely destroyed, and the water rendered unfit for use; and that

the river had, in fact, been converted from a pure and pleasing stream into a foul and noxious sewer, and the bed had been filled up with noisome deposits. Numerous affidavits had been read in support of these allegations, and evidence had been given on both sides, the result being that he was perfectly satisfied that the statements in the bill were grossly exaggerated. It appeared that the river was about 40ft. wide, that it was about 4ft. deep in the summer time, and 6ft. deep in the winter. The consequence was that a very large body of water was constantly passing during the day. There was, however, no information given as to the quantity of sewage as compared with the quantity of water. There was evidence that during the summer of 1868, which was well known to have been an exceptionally hot summer, there was some smell arising from the water; indeed, it was impossible that the sewage of a town containing 5000 inhabitants could run into a river without occasionally producing an unpleasant smell; but it appeared that none of the inhabitants themselves complained of the nuisance, and no one was found but the plaintiff, who did not live in the town, to raise these complaints. It had been distinctly stated in evidence that within the last few months a quantity of fish had been caught in the river, and it was also established beyond doubt that no fresh sewers had been drained into the water; that the sewage was in the same state it had been in for many years, and no material change had occurred during the last five years. All the statements made by the plaintiff turned out to be mere exaggerations. If was no doubt of great importance that the Court should interfere in a case where a serious nuisance was created by pouring the sewage of a town into the pure water of a river; but, on the other hand, it was quite as important that the Court should refuse to interfere where a proper case was not raised. It was clear from the evidence that there was no justification for filing this information, and what possible reason the plaintiff could have had for taking up the case when he had no interest in it, and when none of the inhabitants sided with him, he could not conceive. The Act of Parliament which had already been passed, and which would come into operation on the 1st of July next, had, in fact, provided a remedy for any complaints that might be made, and after that period it would be the duty of the authorities to prevent the sewage from being passed into the river. Under any circumstances, therefore, it would have been completely useless to grant an injunction now. In his Honour's opinion the case had entirely failed, and the bill must be dismissed. Then, as to the costs of the information, if it were dismissed without costs, it would be necessary for the defendants to raise the costs by a rate upon the inhabitants of the town, which would be a great injustice to them. He thought, therefore, the costs ought to fall upon the plaintiff, and the bill and information must be dismissed with costs.

Our Office Table.

The Appropriation of the Site of Newgate Market.—The Corporation of London, with the full consent of the Dean and Chapter of S. Paul's Cathedral, have agreed to the appropriation of the site of Newgate-market. The plans which have been prepared by Mr. Horace Jones, the City Architect, comprise the erection upon the late market site of a large block of buildings, having a road 30ft. wide all round the same—the former paved way between the late shambles and houses not having been more than from 12ft. to 15ft. in width. The proposed plan affords ample light and air both to the intended buildings and to the present surrounding houses. There are to be two passages or gangways 10ft. wide traversing the block, one from north to south, the other from east to west. The ground floor is to consist of 16 shops, averaging 15ft. in width, and 35ft. in depth, with first and second floors of offices, warerooms, &c. Ample cellarage will also be provided.

The National Gallery.—Last week the report of the directors of the National Gallery for last year was issued. The pictures purchased during the year were:—1. A picture by John Martin, of the "Destruction of Pompeii," bought in London in March. 2. "The Courtyard of a Dutch House," by Peter de Hooge, purchased in Paris in March. 3. A "Flower Piece," by Jan Van Huysum, purchased in London in April. 4. A Man's Portrait," by Albert Cuyp, bought at the same time. 5. An altar-piece by Marco Marziale, a rare Venetian master, purchased, together with the two following pictures, in the month of September, in Milan. 6. "The Madonna and Child Enthroned," another altar-piece, by Marco Marziale. 7. A "Madonna and Child," by Bartolomeo Montagna. Among the bequests and donations during the year were George Cruikshank's "Worship of Bacchus," and George Jones's "Relief of Lucknow" and "Passages of the Ganges, Cawnpore." The collections at Trafalgar-square and at South Kensington (assuming that all the visitors to the museum visited the picture gallery) have been attended by 1,804,892 persons on the public days during the year 1869 (761,238 at Trafalgar-square and 1,043,654 at South Kensington). The gallery in Trafalgar-square was, owing to the re-arrangement of the collection, in consequence of the acquisition of the rooms lately occupied by the Royal Academy, open for nine months only during the year; yet the total numbers exceed those of 1868. The daily average in 1869 was 4911, while that of 1868 was 3840 only.

Metropolis Turnpike Roads.—The Commissioners of the Metropolis Turnpike Roads north of the Thames report that in the year 1869 the receipts amounted to £29,198, of which sum £24,086 was from tolls; and the expenditure amounted to £28,407. The Commissioners have been placed in a position to pay off the bonded debt secured on the tolls of the Marylebone and Finchley road; there only remains to be paid a sum of £2773 due to Mr. Eyre's representatives, and when this shall have been paid off the toll gates will be removed. The surveyor reports the failure of water at wells hitherto used for watering the roads,—viz., at the well west of the Pack Horse at Turnham-Green, and at the four wells on the Kilburn-road district; and he reports almost an entire failure at a well opposite Sion-park and one at Ivy-bridge, and a great diminution of the supply at a well in Boston-lane, on the Uxbridge-road district.

Discovery of an Ancient Coffin.—Mr. E. J. Trendell, of the Abbey-house, Abingdon, has in his possession a massive stone sarcophagus, discovered in the course of excavations made in his grounds some time since. It is 7ft. long, 15in. deep, and 2½in. thick, and it is generally supposed to have contained the remains of the illustrious King Cissa, father to King Ina. Cissa was King of Wessex, and is the reputed founder of Abingdon. He gave to Hean large quantities of land, whereon to build the Abbey of Abingdon. Cissa died about the year A.D. 679. On a portion of the lid of the coffin is an elaborately cut raised cross, with the figure of a cross-bow, and other tracings, now almost obliterated.

A Railway Wanted.—Can anybody (asks the *Parochial Critic*) give a reason why, during the railway mania, no one company was formed to connect Greenwich and Woolwich by rail? Thousands of miles of useless railways have been built that can never yield a fair dividend, and yet two most important towns, both on the banks of the Thames, densely populated, are still unconnected by a *chemin de fer*. We congratulate the inhabitants upon the prospect of a street tramway being laid down on the high road, and hope the parochial authorities will not be so blind to the true interests of the ratepayers as to offer any obstacles to the construction of a street tramway.

Art Criticism of the Daily Press.—In last week's *Standard* there is a letter which speaks of Mr. Theed's proposed statue of Lord Derby as a "horrible infliction." How far this is the case, says the *Guardian*, may be judged by the fact that as recently as the 25th of October last, the same paper spoke of this statue "as in every way, both as a likeness and a work of art, an admirable 'counterfeit presentment' of one who was every inch a nobleman." Verily some people have brief memories!

Sebastopol.—The walls of Sebastopol have now been completely restored, and upwards of 300 houses have been built in place of those which had been ruined by the bombardment. A new church, in the form of a pyramid, built entirely of marble, has also been erected in the churchyard of that town. The funds for the construction of the building were raised by a public subscription in the whole of Russia. A sum of 200,000 roubles in all was expended on the building.

Chips.

Mr. Theed is busy in his studio upon a colossal statue of the late Sir Robert Peel, for the borough of Huddersfield.

The Archbishop of York has announced his intention to re-introduce into the House of Lords, after Easter, the Bill having reference to Ecclesiastical dilapidations.

Her Majesty, the "Lancet" learns, has been pleased to signify her wish to open the new building of the University of London in person. The event will take place, in all probability, in the month of May next.

Sir Digby Wyatt, the first occupant of the Professor's Chair of Fine Arts at Cambridge University (founded by Felix Slade, Esq.), delivered his inaugural lecture on Wednesday, in the Senate-house.

The parish church of Greenwich was re-opened on Sunday last. The square pews, with their doors, have been converted into open sittings without doors, and the church re-lighted by means of handsome brass standards. These alterations are completed on the floor, and the galleries are to be re-modelled in the same way.

The Deptfordians are apprehensive that in the course of time they will be inundated with sewage, and perhaps drowned. The accident at Abbey Mills Pumping station has caused the alarm.

A domestic fire-escape has just been completed by Mr. William Frear, a decorator and paper hanger, residing at Woolwich. It is of simple construction, and, being enclosed in a box, presents quite a neat and compact appearance. It has been viewed by several engineers, and has been entrusted to Mr. Merryweather, to test its capabilities.

MEETINGS FOR THE ENSUING WEEK.

Monday.—Royal Institute of British Architects. Special general meeting.

Tuesday.—Institution of Civil Engineers. Discussion upon Mr. Fox's paper "On the San Paulo Railway," and if time permits the following paper will be read: "On the Conditions and the Limits which Govern the Proportions of Rotary Fans." By Mr. W. Briggs. 8.

" Royal Institution. "Deductions from the Comparative Anatomy of the Nervous System." By Professor Rolleston, M.D., F.R.S. 3.

Wednesday.—Society of Arts. "On Surface Decoration." By W. Pitman, Esq. 8.

Thursday.—Society of Antiquaries. 8.30.

" Linnean Society. 8.

" Royal Institution. "On the Chemistry of Vegetable Products." By Professor Odling, F.R.S. 3.

Friday.—Associated Arts Institute. Exhibition of Sketches. Discussion: Thesis, "That there are no present grounds for hope of Progress in Architecture." 8.15.

" Royal Institution. "On the New Thames Tunnel." By P. W. Barlow, F.R.S. 9.

Saturday.—Royal Institution. "On the Sun." By J. Norman Lockyer, Esq., F.R.S. 3.

Trade News.

WAGES MOVEMENT.

The Nine Hours' Movement in the Building Trades.—This movement for the reduction in the hours of labour in the building trades just set on foot by the carpenters has been taken up by the other branches in the trade, and at a meeting of operatives—painters, bricklayers, masons, joiners, plasterers, &c.—held at the Lord Palmerston Tavern, Chelsea, on Saturday evening last, a society was formed to promote the nine hours' movement, and the following resolution was adopted:—"That an invitation be given to the various societies in the building trade to send delegates to the society for the purpose of co-operating with it, and making a united effort of both unionists and non-unionists to obtain the reduction of the hours of labour to nine per day, the present depressed state of trade affording a favourable opportunity for the attainment of that object."

TENDERS.

Chelmsford.—For new premises at Witham, for Messrs. Johns. Mr. Chas. Pertwee, architect, Chelmsford:—

Byatt, Chelmsford	£1260 10
Fincham, Chelmsford	1045 0
Brown, Braintree	930 0
Gozzett, Woodham	902 0
Gardner, Coggeshall	850 0
Choat and Son, Chelmsford	833 10
Roper, Chelmsford	830 0
Messrs. Sudbury, Halstead	800 0
Saunders, Maldon	730 0
Crabb and Letch, Braintree	728 0

Chelmsford.—For enlargement of Orsett Union House Mr. Charles Pertwee, architect, Chelmsford:—

Hall, Grays Thurrock	£2109 2
Larkin, Orsett	1965 0
Fergusson, Paddington	1900 0
Clements, Rochester	1850 0
Brown, Braintree	1844 0
Place, Grays Thurrock	1800 0
Nightingale, Lambeth	1818 0
Fincham, Chelmsford	1783 0
Blake, Gravesend	1770 0
Davey, South Ockendon	1700 0
Withers, Ilford	1630 0

THE BUILDING NEWS.

LONDON, FRIDAY, MARCH 18, 1870.

GOODRICH, HEREFORDSHIRE.

GOODRICH, the principal village between Ross and Monmouth, on the banks of thv Wye, in Herefordshire, contains much that is interesting to the architectural student as well as to the antiquarian. The remains of its ancient castle, the church, of nearly as remote an origin, and some considerable fragments of monastic buildings now attached to a farmhouse, are all worthy of attentive examination. The modern castellated residence, deprived of the splendid contents of its far-famed armoury, which have been transferred to the South Kensington Museum, has, however, little but what would excite the ridicule of an architect of the present day in its mimic turrets and drawbridges, which are but a parody upon the genuine ones in its immediate vicinity. According to Mr. John Taylor, the librarian of the Bristol Library, who has published a short notice of Goodrich Castle, the date of its foundation is not known, nor is it mentioned in "Domesday Book," although its Keep is of Norman work. This was probably built by Hugh de Lacy, the founder of Llantony Abbey. In the reign of Henry II., A.D. 1165, it was held by William Marshall, Earl of Pembroke, and subsequently by William de Valence, who died A.D. 1296. It became afterwards the principal seat of the Talbots, in the reign of Edward III., and here resided the Earl of Shrewsbury, Sir John Talbot (A.D. 1421), famed as the antagonist of Joan of Arc. From a petition preferred against him by the inhabitants of the Hundred of Wormlow, in which district the castle is situated, it would appear that he was a scourge to the neighbourhood as well as to his enemies in France. Goodrich Castle remained in possession of the Shrewsbury family until A.D. 1616, and in that of the Dukes of Kent till A.D. 1740, when it was purchased by Admiral Griffin, whose granddaughter, Mrs. Marriott, now owns it.

The general plan of the castle is a parallelogram, about 180ft. long by 152ft. wide, with a round tower at each angle, and a square Keep in the centre of the south-western side. The entrance is at the south-eastern angle, and is a fine composition—a gateway between two circular towers rising from square bases, with noble squinches continued nearly to the parapet and producing most delicate lines. These squinches in such development seem peculiar to the South Welsh castles, and may be seen at Chepstow and Newport, in Monmouthshire, but nowhere with such perfection and refinement as here at Goodrich. The depth of the gateway is not much less than 50ft., and its passage was defended by a drawbridge, and loopholes on either side. The chases for the first gate are 10ft. within the archway, aud above it were holes to pour from a chamber above molten lead or missiles upon the heads of those attacking it. At intervals about 7ft. beyond were two portcullises, the spaces between being exposed to loopholes at the sides, and similar means of defence from above. Behind these there was another gate, and 6ft. further on a doorway leads to a long, narrow gallery formed in the thickness of the wall to give access to the loopholes referred to. These numerous contrivances rendered the access to this castle unusually dangerous and difficult.

Alongside of this gateway are the ruins of the chapel. Few of its details are left, but sufficient to show its arrangements, which appear to have been very complete. Corbels on either side show the position of the screen which divided off the ante-chapel, and a small apartment or recess in the thickness of the wall is supposed to have been used as the confessional. The details, which are much mutilated, are of Early English work, with alterations and additions of the period of Henry VI. A lofty octagonal tower, called the watch-tower, adjoins the chapel, and was probably occupied by the chaplain and the warden, and thence access was obtained to a covered passage along the wall to the circular tower of the south-west angle, which is 36ft. in diameter, and with walls 8ft. thick. In this tower upon every floor is a trefoiled-headed recess for a lamp on the landing opposite the doorway, and the remains of a chimney-piece upon one of the upper floors is a charming work of the Decorated Gothic period, with delicate corbels composed of three mouldings, composing a triple shaft with minute capitals dying below into the jambs without bases. Many of the castles in this part of the country have charming examples of chimney-pieces of this character, among which may be particularly mentioned those of S. Briavel's, in the Forest of Dean.

The Keep, of Norman work, is square, with pilasters at the angles, and has a semicircular-headed doorway and some couplet windows divided by columns, with other details of good character. In its basement was a strong apartment about 15ft. square, with an inner cell entered by a low Pointed archway. This has hardly any provision for light or air, and was constructed under a license from Edward III. by Richard Talbot as a prison.

The tower at the other angle of the west side of the castle is circular outside, but rudely polygonal within, and is of the Perpendicular style. On the north side is another tower, called the Ladies' Bower; near this is the withdrawing room, with the kitchen and its appurtenances below. The latter are so filled up with rubbish as to be difficult to distinguish; the stone sink of the scullery is, however, still to be seen. The drawing-room must have been a fine apartment, with lofty lancet-headed windows divided by mullions; it was separated from an ante-room by an arcade of two well-moulded Decorated arches supported upon an octagonal shaft which was continued down to the basement below. This feature, through which, as a frame, and the breach made in the tower beyond at the time of the Great Rebellion, the windings of the river Wye and a lovely country are now visible, is one of the charms of this unusually picturesque ruin.

Some remains of an equally fine banqueting-hall also exist, with a delicate corbel with a single short detached column in it which supported an arch of division, possibly over the dais, from the rest of the hall is well worth notice as resembling somewhat upon a humble scale the magnificent one at Chepstow Castle.

The church, at some little distance, although sadly mutilated, corresponds in detail with the Gothic architecture of the Castle, but it has no remains of Norman work. It has no structural division between nave and chancel, and consists of two aisles of equal length, the arcade dividing them being Early English, with a tower without any belfry windows, and a lofty spire with four lucarnes, and a south porch. The porch is curious, as possessing besides the wide archway in the usual position, a smaller one on the east side, with a window alongside. The object of this is not apparent, but the effect is very picturesque. The walls are dilapidated, and the roofs modern, and the windows have in general been replaced by larger ones of bad character. The structure is, however, about to be substantially restored, and the roofs renewed, at the sole cost of the vicar, the Rev. Henry Morgan, under the superintendence of Mr. Seddon, the architect.

The monastic remains referred to as attached to a farmhouse in the neighbourhood are the remnants of Flanesford Priory, founded by Richard Talbot, who served in the wars of Edward III., and died in 1356. A noble hall, with decorated Gothic windows, is now used as a barn, and is in very fair condition, and should not be overlooked by any architect who may visit the Castle, from which it is but a very short distance.

LONDON AND ITS ORNAMENTATION IN 1870.

THE Thames Embankment has this advantage, that it makes a full and large display, and the constructive merits of the engineer, with regard to its foundations, can be allowed for. It has, it is true, two chief aspects, that of its river frontage and that of its capacity as a promenade, but the river fronts are long masses, making an open account of a large expenditure for a great work. Thus the engineer is well represented. The Holborn Viaduct does not show itself in the same way. Most of its best work is buried from sight, and in no point of view will it give a great impression as the work of one mind, because in a short time it will come to be regarded as a natural feature. Before five years, perhaps Mr. Haywood will cease to be thought of as the author of the Holborn Viaduct, because, fulfilling the functions for which he has designed it, it will be worked in as an integral and indispensable portion of our great thoroughfares.

It is a singular consequence of success, but one of the best auguries of sure success, that a man should efface himself in the thorough accomplishment of his work; absorbed in his own approach to perfection as in the dogmas of the Buddhists. There is one comfort, this Nirvana can never befal a vain man, and torment him, for he will never be tempted to attain it. Except that the houses are unbuilt, and these are so far proofs of newness, the carriage passengers are already becoming accustomed to this grand thoroughfare, and, accepting its usefulness, regard it as an established institution.

The designer of the Viaduct has to depend for remembrance on partial exhibition of minor works, which are separately treated—such, for instance, as the Farringdon-street views of the Viaduct itself. Here, again, successful realisation rejects applause. The throng of spectators, who once passed, and might have admired the frontages, are now raised up high in air to another surface and an upper world, and Farringdon-street and Holborn-bridge have to seek in the growth of the metropolis future crowds of wayfarers. Under these circumstances an incident of the upper Viaduct is noteworthy, and that is the knots of gazers who stop to look at the bronze statues.

It was no doubt conceived that these four statues were simply designed as terminals for the piers, as seen from Farringdon-street below. For that purpose they serve, but at such a height from the street artistic details would be lost, and therefore Mr. Haywood has found a further resource by turning the faces of the statues to the main thoroughfare. The bases are not high, the figures of moderate height, and the whole can be well seen. They arrest the attention of the passerby. They have their names, as Agriculture and Commerce, plainly set forth, and the spectators are led to judge how far the sculptor has answered for the task set him. They seem to go to work with a will. It is not a glance and then push on, but everything is carefully scanned, and in many cases lengthily discussed.

It is probable that these minor and not costly works have done more for awakening the interest of the population, and created more work for artists than many of the larger and expensive monuments. They are only the application of a mode of ornamentation common enough in France and on the Continent, and within the means of any municipality. It does not exact the highest genius for art, but it requires careful and exact treatment, giving remuneration to assistant artists, and affording the young sculptor scope for distinction. Very few are aware how

narrow is the field open to the exertions of our sculptors. It is loosely thought that public monuments give scope for competition, and the reward of employment. The opportunities are however rare. Just now all that is in prospect is the Derby monument. Altogether these things are lottery prizes, and like such prizes they are apt to do more harm than good. They are often awarded under the influence of a clique, and besides, there are natural and prudential considerations which limit the decision. A committee hesitates before giving a commission of £5000 or £10,000 to the best design of a man whose reputation is not established. The delay in the Wellington monument for S. Paul's has been enough to frighten any committee. A dull man of good business habits, possessing the confidence of dull men of good business habits, will lay hold of a good supply of commissions, and keep many young men of ability in the drudgery of his workshop making reputations for one who wants genius, and closing more surely against themselves the avenues to distinction.

The sculptor is thrown upon private practice in busts, and is glad if he can earn a decent living in a quiet way. If he misses a public commission in bronze or marble, he may obtain no further achievement than a private commission in stone. Such is the fate of many a man of genius, well regarded and well supported. These descents to inferior personation are among the bitter trials of a sculptor. There is a very good example now on hand. Thomas Milnes, the sculptor, is named as having the good fortune to execute four colossal lions for a liberal patron of art, Sir Titus Salt. These lions are, however, those originally designed, and supposed to be commissioned for the Nelson Monument in Trafalgar-square, by the Board of Works, but superseded by the productions of the late Baron Marochetti. Milnes's lions are now after long years worked out in a brownish Yorkshire stone. They are fine and notable productions, which leading connoisseurs go out of their way to see, but they are carried out in an inferior material, and placed in a private gentleman's grounds. A group of sculpture, Sampson and the Lion, of the same sculptor, approved by two Chief Commissioners of opposite parties, and which they wished to be in marble and placed in one of our public gardens, was next estimated in stone, and even then found to be outside the mercies of the budget. If a sculptor makes a sacrifice of money in order to obtain a public situation for a favourite work, even then he has no security. A man such as Milnes, and many more, may stand before his model wishing, like Pygmalion, it would come to life with as good expectations of success as he has of getting it before future generations in the higher forms of art.

The statues on the Holborn Viaduct are therefore of this value, that they set a good practical example for the encouragement of sculptors, and the popularisation of art. So far as the Viaduct is concerned, they serve a good purpose and contribute to the monumental appearance of this great thoroughfare. In the Holborn-circus will be placed the Albert monument, a good situation for a great work. From that point westward the monumental character of this great artery ceases, no public buildings being available. There is little hope of the Museum façade being to to any extent thrown open. The only chance is the erection of other public monuments on the route. If the railway street from Charing-cross to Tottenham-court-road should be carried out this will afford a relief, and so too any street running by the Law Courts. The Viaduct will in all likelihood place this great line before the public as a more valuable resource for the advancement of the metropolis.

An incidental result of the Viaduct is to give us the effect of an upper town, with its raised lines of communication overlooking large streets. This the railway viaducts do not accomplish for us, as the arches are from motives of economy kept as low as possible. The great arch of the Holborn Viaduct commands in the daytime a great expanse of crowded streets and at night a wide extent of illumination. It remains for the Corporation to turn these features to account. They are resources ready furnished, which require care rather than expense to make available, so as to add to the attractions of the scene, and to make it one of the most remarkable city sites in the world, possessing great animation in the movement of its thoroughfares, always an element of grandeur to the visitor.

There is another opportunity yet to be taken advantage of. The Holborn Viaduct is seen on the north from Ludgate-hill as a scenic close to the wide street, but before, intercepting the view of St. Paul's, is the unhappy railway bridge. Here a small circus is laid out, which has every chance of being carried out without system, and so as to make a muddle of a fine situation. It would be easy to compose the two eastern quadrants with the railway bridge, so as to give on that side a new Lud Gate, and what would then appear, instead of an impediment, a portal to St. Paul's.

Hyde Clarke.

SOCIETY OF ARTS.—ART WORKMANSHIP COMPETITION, 1869-70.

The following is the Report of the Judges in this competition :—

In submitting our list of awards for the competition amongst the art-workmen for the session 1869-70, we desire to congratulate the Council of the Society of Arts upon a more worthy response to their liberal invitations to the workmen to forward good specimens of their handicrafts than was made last year.

This improvement is manifested rather in the absence of the very bad than in the presence of the very good. In the second division, however, comprising the application to ordinary industry of prescribed art-processes, we have met with several works of conspicious excellence. Foremost in the list of these, we must place the ornamental iron-work for the balcony of a window, executed by Mr. William and Mr. Henry Robson, a work uniting three special merits—elegant and not over-loaded design; masterly technical execution in forging, twisting, &c.; and moderate price. We are fully aware of the high position occupied in metal working generally by this country at the present time, but we look upon this work of the Messrs. Robson as an especially good example. We have, therefore, awarded to it the North London Exhibition prize for the best specimen of skilful workmanship at the Society's exhibition, in addition to a premium of £10.

In several other instances the exhibition contains good evidence of excellence in metal working, and the Messrs. Emms' balcony and wrought-iron bannister are very satisfactory.

In metal working in other divisions we have to commend highly the "Virgin and Child," worked in low relief in iron, after an example in the South Kensington Museum, by Mr. A. Dufour. In this case we have also to notice excellent work combined with moderate price. To Mr. A. Dufour we have awarded a premium of £10, while, for a corresponding work, executed by Mr. Adolf Ostertag, we recommend that a prize of £5 should be given.

The hammered iron knocker, executed by "A.S.," is large in style, and well and simply treated.

In coppersmiths' work, the repousse mask wrought by Mr. G. Deere is well "bossed" out, and may be regarded as a skilful piece of workmanship. Mr. A. Millward has forwarded a good specimen of the inlay of German silver in copper, and a still better circular ornament pierced in metal; the latter is agreeable, and characteristic in design, and is worked with a cleanliness of cutting and truth of figure highly to be commended.

It is to be regretted that, in working in the precious metals, in which at the present time the art-workmen of Paris and Vienna are so superior, the Society's Exhibition should contain nothing worthy of notice.

In the second division, however, we are glad to recognise, on the part of Mr. Alfred Gray, a power to execute enamelling on metal in the style (a novelty in this country) which has gained so much reputation for the houses of Christofle and Barbedienne, of Paris. We have awarded Mr. Gray, for his miniature frame, a premium of £7 10s., and shall hope to see him, on some future occasion, displaying his command over the various processes of enamelling upon a more elaborate and important scale. The application of enamelled colours on ceramic bodies, so as to form elegant commemorative tablets, has been fairly shown by Messrs. Evans and Griffiths, of the Potteries, to whom we have awarded a premium of £5.

We are further pleased to be able to remark that the Society's invitation to workmen to compete under their second division has succeeded in eliciting marked novelty and excellence in English glass-working. Mr. Joseph Leicester's three champagne glasses, with filigrani in the cup, stem, and foot, fairly rival the products of Venice. The works of Mr. Barnes, though not so elegant, display command over several difficult processes in glass-blowing. In the same division Mr. Charles Pfänder contributes various agreeable specimens of painted book-covers of a more or less novel character; and Mr. E. T. Grove an envelope case, in various woods, enriched with carvings in low relief, and marquetry, of neat execution, and marking progress in the application to ordinary industry of an art-process hitherto comparatively little used in this country.

In the classes of carving in wood, carving in ivory, painting on porcelain, and modelling in plaster, there is little call for remark, although a fair average has certainly been maintained.

In cameo cutting, we remarked an excellent portrait of Dr. Billings, for which we have given a premium of £5.

Among the works of exceptional merit, not previously referred to, should certainly be noticed Mr. H. J. Hatfield's beautiful bronze missal cover, pierced, and chased with great truth and taste.

In etching and engraving on metal, the works of Mr. S. Gill and Mr. J. Gittins were of such equal merit in our eyes as to entitle each of them to a premium of £5.

The embroidery executed by the Misses Pfänder reflects credit upon those ladies.

We noted the contributions to the exhibition of the veterans, Mr. Louis Genth and Mr. Mark Rogers, whose works we have commended.

A decided novelty in marquetry, contributed by Mr. W. Clayton, to which we have awarded the premium of £7 10s., appeared to us likely to be valuable for purposes of internal mural decoration.

Upon the whole, and in conclusion, we have to express our conviction that the Society of Arts, should it see fit to continue its liberal invitations to art-workmen to compete for prizes, cannot do better than offer a somewhat similar programme for the ensuing year to that of 1869-70, varying, however, some of the prescribed designs, the repetition of which has now become monotonous.

Signed, { Richard Redgrave. / George Godwin. / M. Digby Wyatt.

Institution of Naval Architects.—This Institution will open its annual general meeting on Wednesday, the 6th April, in the Lecture Theatre of the South Kensington Museum, which has been placed at the disposal of the members by the courtesy of the Committee of Council on Education. The remaining three days of the week the Institution will met as usual, through the permission of the Society of Arts, in their great hall, in John-street, Adelphi. The meeting at South Kensington has been arranged with the view both of obtaining a little extra time for the discussions upon the papers read, and in order to enable the members and associates and their visitors to inspect the premises of the Royal School of Naval Architecture, and the valuable collection of models of ships and marine engines in the Naval Gallery at South Kensington. The programme of papers to be read has not yet been completely settled, but some interesting contributions to the theory and practice both of naval architecture and marine engineering have already been promised.

It now appears to be certain that the extension of the Metropolitan District Railway beneath the Thames Embankment from Westminster to Blackfriars Bridge will be completed and opened for traffic by May 1.

Civil Engineering.

SCREW PILES.

IT is a fact worthy of notice that although screw piles have been in use in England and the transatlantic continent for nearly forty years, they have scarcely been employed in France on any scale that warrants a description. This is the more difficult to understand since the value of the principle is universally recognised, and in many situations it would be impossible, in an engineering point of view, to obtain a foundation without them. It is, in fact, only since their introduction and the establishment of their advantages that certain structures, lighthouses for example, have been successfully erected on shifting sands, and other kinds of foundations, upon which, by the ordinary methods in use, no superstructure could have ever been erected. On the Bombay, Baroda and Central India railway screw piles were employed as the means of obtaining a foundation in the numerous rivers crossed by that line. They were screwed down, sometimes by capstan power, at others by yoking native cattle to the end of a long lever, until they came to a firm substratum. Several of these properly braced together formed the piers upon which the iron girders were placed, which were nearly all of a uniform span of sixty feet. Unquestionably one of the chief merits of the screw pile is its great suitability for rapid rivers, which sometimes during a severe draught are nearly dry, and which in flood time, roll down their waters with all the impetuosity of a mountain torrent. The screw pile not merely fastens itself firmly into the ground, but its comparatively small sectional area offers but little impediment to the motion of the stream. At the same time, it must not be forgotten that there are certain descriptions of substrata for which the screw pile is not adapted, and where it becomes necessary to seek a foundation by the employment of other means. We shall allude to this presently. The first application of the screw pile principle was made by the inventor, Mr. Alexander Mitchell, in the harbour of his native town, Belfast, where some buoys were successfully anchored in that manner. The lighthouses at Fleetwood and the Maplin sands demonstrated a few years afterwards that the invention was likely to prove of great utility to engineers. The former of these was carried away bodily about a month ago by a schooner which ran into it. It was only the superstructure that fell, the piles remaining in their place. A large number of dock walls, jetties, breakwaters and other engineering works have been erected solely upon foundations secured through the agency of these piles. A brief description of their advantages and suitability for the purposes of foundations will prove of interest to not only our professional readers, but to the amateurs as well.

A screw pile only differs from an ordinary one of timber, or cast or wrought iron, by being furnished at the lower extremity with a screw or spiral. The screw is of particular construction, as it is provided with ouly two or three turns, or more correctly blades, which are of different diameter. The upper of these has the greatest resistance to contend with, and is therefore of a larger diameter than the others, sometimes reaching the dimension of four feet. The pile being adjusted in either a vertical or inclined plane as required, a movement of rotation is imparted to the upper extremity, and the penetration commences. One of the chief merits in thus obtaining a foundation is that the pile does not dislodge the earth near and round about it, but bores its own way, so to speak, without disturbing the neighbouring layers. Thus fixed in position, the pile can be used either as a mooring post, or as a portion of a pier upon which to erect a bridge, jetty, or other analogous superstructure. The screws are either cylindrical or conical, of cast or wrought iron, and the piles may be also of either material, or of timber. The employment of the latter in connection with the screw end is rare. According to the nature and consistency of the ground to be penetrated, so must the shape and size of the screw be proportioned. If the earth be of a loose, friable, easily penetrable character, a cylindrically formed screw will answer for the purpose; but if it be of a compact, tenacious description it becomes necessary to use a screw in the shape of a cone. No screw, whatever may be its form and powers of boring, will penetrate into absolute rock, but the principle has been successfully applied in instances where the foundation was a bed of coral. It is manifest that the power required to get the pile down will depend altogether upon the nature of the ground to be penetrated. As a rule, a capstan worked by manual labour is found sufficient. One of these machines with eight bars about twenty feet in length, each manned by five or six labourers, has been found capable of getting down a pile four feet in diameter, to a depth of fifteen feet in an hour and a half, in ground composed of sand, clay, and loose rock of a schistose nature. The conditions being the same, a period of two hours was sufficient to sink a screw pile to a depth of twenty-one feet. In cases where it is not possible to employ the leverage of capstan bars, that is where room cannot be obtained for erecting a platform, the head of the capstan is furnished with a wheel which can be worked by an endless rope or chain set in motion by a gang of men. Where the earth is very dry, screw piles can often be "got down" by very simple means. It sometimes suffices to fix to the upper end of the pile a rod with an eye in it to attach a short iron lever, and screw the pile down. This arrangement will only be available for short depths.

The especial advantages of screw piles are considered generally to have more relation to bridge foundations, than any other engineering works, but there is another very important application of the principle which we have as yet only touched upon. It relates to the anchorage of buoys, and mooring posts for vessels. Obviously the desideratum in this particular class of works is that the hold or grip of the anchor should be a maximum. In other words, what kind of anchor will give the greatest resistance to a tensile strain, tending to cause it to drag, the anchor itself being of the least weight? It is a simple question of a combination of maximum hold with minimum weight. About twenty years ago some highly interesting and instructive experiments were undertaken with a view to the practical elucidation of this important point. Some of the best-made anchors, weighing two hundredweight, were dragged along the ground, by a force which produced no effect upon a screwed mooring, inserted to a depth of three feet, and weighing only eight pounds. Others weighing seventeen pounds resisted hauling bett er than anchors having a weight of nearly five hundredweight. The value of screw piles and moorings for lighthouse, jetties, breakwaters, and floating signals, and all structures exposed to violent hurricanes and sudden impactive forces, can scarcely be over estimated. On this account they would be found very useful in stormy latitudes, for securely fixing telegraph posts, as it is the commonest occurrence in the world to hear of the telegraphic communication being interrupted in consequence of the posts being blown down. There is one more point relating to screw piles that deserves mention, although probably it is seldom brought into notice. It is the facility with which they can be "drawn." All that is necessary to accomplish this task, which with piles of a different description is a very tedious and laborious one is to reverse the operation of getting them down—in a word, to unscrew them. It might be stated that when a pile is once down, it is not intended ever to come up again. This assertion is not quite correct, even for permanent works, and certainly incorrect when temporary works are considered. Piles are sometimes required to be drawn in situations when it has been thought that they were down "for good." In works of a temporary nature, where the piles are of timber, they are seldom permitted to be drawn, as the operation would disturb the foundations of the permanent structure, but are cut off near the ground level. If screw piles were employed in temporary dams and such like work, they might be drawn, as the unscrewing would scarcely affect the ground in any sense, and their comparatively small sectional area would still more lessen the chance of any danger. The piles might thus be used over and over again, and constitute a regular item of the contractor's plant. Perhaps the only description of ground that would be unsuitable to the use of these piles would be a stiff clay. The screw would get clogged and the labour of getting it down would be more than what would compensate the other advantages. Hollow cylinders would be the proper substitute to employ in such a case.

ON ORNAMENTAL IRONWORK.

SIXTH LECTURE.

MR. CAPES delivered his concluding lecture on this subject on Monday evening last. After some brief remarks on topics touched on in his former lectures, Mr. Capes referred to the widespread prejudice existing against the use of iron as a material in which to execute works of art. Some people, he said, looked upon iron as being all very well as a material for the construction of railways and steam engines, but thought it incapable of being applied for highly-decorative or ornamental purposes. How unfounded was such a prejudice was seen by an examination of the small coffers, caskets, locks, &c., of wrought-iron executed in the Middle Ages, which exhibited the highest finish and delicacy of workmanship. (Several specimens of this kind of work were exhibited, and the general characteristics of their details were pointed out by Mr. Capes.) The lecturer, in continuation, said it was greatly to be regretted that so little work of this kind was called for at the present day, owing to its beauty not being recognised by the public. Most persons cared for quantity rather than quality. As a rule, a man in decorating his house sought to make as much show as possible, and this prevailing fondness for display at a cheap rate was a special misfortune for those who were workers in ornamental iron. It was their misfortune in two ways—first of all, because it was entirely out of the question to make thoroughly good ironwork very cheap, as it must always be to a great extent made by hand and not by machinery. Secondly, the beauty ot wrought iron was not of that particular kind which attracted the ignorant multitude of purchasers—whether habited in fustian and corduroy, or having large balances at their bankers. Good wrought-iron-work was not, in a word, smart or showy. Mr. Capes next proceeded to point out the special adaptation of such small works as caskets, locks, hinges, &c., to the circumstances of the art-workman, as, being small, they could be produced in a workshop only a few feet square and with a small forge and few tools. The lecturer ventured to hope that as the community became better educated there would be a revived demand for works of art of this kind. He next alluded to the practice of engraving on surfaces of iron and steel, which had now very much gone out of fashion, but which was capable of producing the highest results. This kind of work owed its abandonment in great measure to the expense incurred in engraving on so hard a substance, but the engravers of steel plates for the production of prints had for some time past used a kind of steel prepared in such a way as to allow them to cut into it with facility, and the engraving being finished, the plate was hardened. He saw no difficulty in the way of applying the same process to the engraving of steel for purposes other than the production of pictures. He hoped we might see the day when a taste for chased and engraved steel would be as common as it was formerly. How beautiful were the effects produced by such processes would be seen by inspecting the Meyrick and other collections of

armour. Oriental metal work was peculiarly profuse in examples of what could be effected by such means. In his concluding remarks, Mr. Capes dwelt on the general position of the English art-workmen, the necessity for persevering study, the influence of schools and museums, and the connection between general education and the special needs of the art-workman. He said that it was perpetually being put forward by writers in the present day that if we were ever to have a revival of the workmanship of former days, and if England was to rival foreign nations in the originality and beauty of their designs, our art-workmen must be something more than mere copyists of old works. They must cease to be mere machines, and become, in their degree, real artists, working with a real feeling, love, and understanding of what was beautiful. This view he held to be entirely true—it was *feeling* for art and beauty of which so much was needed. This feeling and love for art had been of late years much fostered by the South Kensington Museum and the various schools of art in connection therewith. The masses were gradually being leavened by such agencies, and not only was the art-workman induced thereby to produce a better article, but the public were led to demand more artistic productions. The necessity of persevering art study was strongly insisted upon by the lecturer, who also advised art-workmen to cultivate all their faculties as much as possible. He would advise them to turn aside from no one branch of learning to which they had an inclination, under the idea that it would give them no practical help in their studies as art workmen. The social life of the workman exercised great influence on his work. It was undeniable that the kind of life which the London artisan was obliged to live, through the want of proper house-room, was most unfavourable to the cultivation of the artistic spirit both in himself and in his children. His advice to art-workmen was, wherever possible, to live a few miles out of London, where they could study nature and spend their Sundays in quiet enjoyment. To say nothing of the increased healthiness of their families, the cost of the daily train, and the rent of a small comfortable cottage, a little way out, would not together exceed that paid for two or three miserable and perhaps ill-lighted rooms in London. In London everything was dirty, and almost everything was ugly, and there was nothing to call out whatever latent gifts nature may have bestowed upon the workman. He supposed that, putting it at a very low rate, 6s. or 7s. per week had to be paid for poor and confined accommodation in London—say two or three rooms. 5s. per week was £13 a year, and that was very nearly equal to 7 per cent. on an outlay of £200—a sum for which a man might buy out-and-out half an acre of land, and build a good roomy cottage. If builders and landlords a few miles out of London understood their own interests they might supply good cottages for artisans at a rent of from £12 to £14 per year. It was utterly useless to preach to workmen about cultivating their tastes until they had more pleasant homes. At present, they and their families were "cabin'd, cribb'd, confined" in a way not only injurious to health, but in a manner which render common decency almost impossible.

A vote of thanks to the lecturer was proposed by one of the audience, an iron-worker, who expressed his opinion that if our architects would but give their influence to a more extensive use of wrought-iron work, our streets would assume an improved appearance. The proposition having been seconded, Mr. Capes briefly acknowledged the compliment, and the meeting adjourned.

NEW THEATRES.

A NEW theatre is to be erected at Hanley during the coming summer. It will occupy the same site as the present building, which is a very inconvenient and inelegant structure, and will be more than twice as large. It will be 113ft. long, by 54ft. wide, with two tiers of boxes, gallery, and pit, seating 3200 persons. The stage will have a depth of 42ft., and a width of 54ft. and will be provided with an iron drop-curtain, as a precaution in case of fire. The dressing-rooms and green-room, will be on a level with the stage. Attached to the boxes and pit will be retiring-rooms. The street front will be in the Corinthian style, the materials used being red, black, and yellow bricks, with terra-cotta pillars, caps, pediment, and panels bearing medallion portraits of Massinger, Shakespeare, and Ben Jonson, and monograms of the proprietors. The scenery will move vertically, instead of horizontally, and spacious cellars will be left below the stage. The estimated cost of the new erection will be £4500, and the plans have been prepared by one of the proprietors, who is said to have given much study to the subject.

The new theatre in the Strand, now in course of erection, is to be named the "Vaudeville," and will open in May.

The prospectus has been issued of the Denmark Theatre and Winter Garden Company, which is formed with the view of erecting on the site of Saville House, Leicester-square, a theatre, winter garden, club, and restaurant. The capital is £150,000, in 30,000 shares of £5 each. We gave an elevation of the proposed theatre in THE BUILDING NEWS for December 24th last.

The new Variety Theatre, situate in Pitfield-street, Hoxton, was opened on Monday evening last.

ARCHITECTURAL ASSOCIATION.

AT the usual fortnightly meeting on Friday evening last, Mr. Lacy W. Ridge, President, in the chair, Messrs. E. T. Parrot, J. Kiddell, jun., F. O'Connor, E. E. Moore, and D. Anderson were elected members. It was announced that to-morrow (Saturday) afternoon, the members would visit the Improved Industrial Dwellings in Ebury-street, Pimlico, and some schools which are now in course of erection from plans by Mr. Currey. Mr. Phené Spiers urged those who intended to go up for the Voluntary Examination this year to prepare for the preliminary examination, so that they might pass with distinction the final ordeal. Mr. Rowland Plumbe having pleaded for more recruits to the Artists' Rifle Corps, the President appealed for funds in aid of the establishment of the proposed Architectural Art Classes. £250 will, in the first instance, be required for fitting up class rooms, and other expenses, although the Architectural Museum has placed a part of its premises and the use of its casts at the service of the classes. The Committee of the Classes hope shortly to announce the opening of the classes for "drawing the figure" and "drawing of ornament." Mr. Lacy Ridge is the secretary of this Committee, which is made up of five members of the Institute (including the chairman, Mr. Charles Barry), five representatives of the Architectural Museum, and five members of the Architectural Association (exclusive of the Secretary).

Mr. R. ALMOND then read a paper on

THE DOMESTIC ARCHITECTURE OF THE REIGN OF QUEEN ANNE.

The lecturer, after noticing the political and social aspects of the age, said that while raising St. Paul's as a temple and Blenheim as a trophy, the architecture of the period parodied neither temple nor trophy, and were there nothing else to be said in its favour, this was more than could be said of some of the architecture of the present day. In modern works in the Mediæval style, from Strawberry Hill and Fonthill down to hundreds of the most recently erected, the church was to be traced in a variety of forms. In spite of Pugin's cautery, more than thirty years ago, that we think "nothing Gothic unless it comes out of a church," from what is seen on all hands plenty of the idea is still in existence, and these remarks apply in even a greater degree to modern domestic works in the Classical style. Specimens of the genuine architecture of the reign of Queen Anne, are to be found in the following localities:—Hampstead, Highgate, the East-end of London, Walthamstow—almost a Queen Annean village—Edmonton, Tottenham, Waltham Abbey, Hackney, Leyton, and Leytonstone. Essex, of all counties, is particularly rich in structures of the period, of which, also, many may be seen on the walk from Putney to Richmond; St. Albans, too, abounds in them. The lecturer said that at one time he conceived the idea that the style of these buildings was solely the result of the rapid strides that Classic architecture had made in this country, but, after studying many examples, he believed their architectural expression, as far as architecture could express itself, to be neither more nor less than the development of the Elizabethan and Jacobean styles, and as purely English as any we possessed. In fact, he believed that had we gone on thus progressing, instead of forsaking the true path for types of monumental Roman and Grecian architecture, we might now possess a school which, though it might be faulty, would be British to the backbone, and equal to any modern school abroad. Any originality the French metropolis can lay claim to is owing to the development of a style similar and contemporary with the one which formed the subject of the lecture. Mr. Almond denied that Harley and other dull and dreary streets were the development of the Queen Anne architecture; those streets had as little to do with the style as the structures erected at the present time by speculating builders had with the Pandolfini and Farnese palaces. In Queen-square, Great Ormond-street, and many other streets and squares of the same date, no matter how plain the exterior of the houses, the internal work will be found to be of the most finished description. If ever, said Mr. Almond, there was an epoch when delicacy of design and finish of execution were carried to a high pitch, it was that of the reign of Queen Anne. If boldness without obtrusiveness, delicacy without weakness, scholarly art without pedantry, commended themselves to thinking men, the architecture of the period under discussion would also commend itself. As solidity, firmness, permanency, and all that suggests similar ideas is the keynote of the beautiful in architecture, he would leave decoration aside, and remark on the small amount of repair which the buildings of that period he had examined appeared to have undergone. The amount of repair which a building required was a sure test of the ability of the architect or the parsimony of the employer Having, as a rule, overhanging roofs of a good pitch, well-marked dormers, and tall chimneys, though generally built on a square plan, the houses of the period seldom fail in being picturesque. If the originators of strikes, trades' unions, and the members thereof, together with the speculating builder, were to study the various specimens of handicraft displayed in such houses, we should suffer less from the conceit of the bungling workman and his penny-wise employer. The bricks are a study alone. They are somewhat smaller than those that are now in use, and not at all inferior to the well-known Italian terra-cotta. In some instances, so carefully is the bricklayer's work executed that much of the ornament in that material is carved, and the cornices, strings, &c., were frequently finished with the chisel after they were fixed. The colour of the bricks, again, was unequalled in the present day, though doubtless age and exposure to the weather had something to do with the tone of the brickwork. A very good specimen of a modern lodge in this style is to be seen in Kew Gardens. The roofs of the domestic buildings of the reign of Queen Anne were always of flat, red tiles, and one of the greatest charms such buildings now present is the loveliness of the colour of the roofs, instead of the wretched coldness of the modern, blue-slated roofs. Their builders never went in for ornamental ridge-cresting, consequently the even line of the ridge remains unbroken. Of the external woodwork, the cornices are mostly of wood, and in many instances richly carved and carried by beautiful consoles. The external doorways and doorheads were generally carved and embellished in the richest manner, and a walk in Great Ormond-street, Bloomsbury, or Queen's-square, Westminster, with a view of examining these features, would well repay the trouble. But it was in their staircases that the builders of the time of Queen Anne so far excelled us of the present day. All the art and ingenuity that could be brought to bear was lavished on this important feature. The balusters and handrails were most varied in design and richly carved; the handrail never took the hideous and unmeaning form of the ramp of modern handrails. The ends and soffits of the stairs were richly ornamented and panelled, whilst a handsome wainscotting, 3ft. or 4ft. high, took the place of the miserable skirting which now habitually follows the rake of the stairs. Many such staircases were of oak. There are few rooms more comfortable than a Queen Annean wainscotted-room, with its richly-moulded and carved panelling—a feature which affords a fine field for gilding and colour, and by which an effect might be obtained which would entirely throw our modern paper-hung rooms into the shade. The windows and houses of this period were more pleasing than those of the present day, owing to their having nearly as much moulded wood in their composition as they had glass, thus ensuring a most satisfactory play of light and shade, in-

stead of looking like immense black patches, as is the case with the large plate-glass windows of the present day. In such houses there was but little scope for the stonemason, except in the copings to the gate, piers, vases, and probably a coat of arms or two ; but where such work did occur, it was generally executed in Portland stone of good quality. The mouldings were delicate and truly workmanlike. The marble-mason and carvers' works were more in request. The approaches from the garden gate were generally paved with this material, as well as the halls and passages inside the building, very often in black and white marble chequer-work, which had a very good effect. But it was principally for chimney-pieces that the marble mason was in demand. These and the hearths were very often very elaborate, and of different kinds of marble. The grates were of a very quiet character. They had delicate steel mouldings and borders, the latter being very often richly chased. Plastering in the more important apartments was but little used, as the walls were for the most part wainscotted, and generally where this was the case the cornices were also of wood ; where, however, ornamental plaster ceilings are found, the work is of the best description ; indeed, no period ever equalled this for the beauty and excellence of this kind of work. For the most part, the enriched work was moulded in the first place, and afterwards carved with chisels, hence its great merit. But the crowning glory of the Queen Annian period of art was the metal-work, as applied to gates, railings, and vanes, the whole of which, for merit of design and excellence of workmanship stands unrivalled. At no period in the history of art has ironwork taken so legitimate a form as during this epoch. It was principally scrollwork, and most varied in design, leaves, coats of arms, and other ornaments entering largely into its composition. How different were the gates of this period to the modern cast-iron gate, or, for that matter, to much of the ecclesiastical metal-work of the present day ! The lecturer here referred in detail to a few houses typical of the style of architecture of Queen Anne's time, among which he named the Asylum for the Deaf and Dumb, at Hackney ; Leyton House ; two houses at Walthamstow ; the Custom House at King's Lynn, Norfolk, and a house at Hadleigh. In conclusion, Mr. Almond said that these buildings taught us lessons ever to be remembered in domestic architecture. They were marked by modesty, homeliness, fitness, and comfort. They appeared to have sprung from the common sense of the country, and to have risen above the prejudices of the mere popinjays of architecture. A revival of the domestic architecture of the Middle Ages could never be a complete success, but the taste and civilisation of those who dwelt in the domestic buildings of the reign of Queen Anne were at the very least equal to those of the population of Pimlico or the tenants of Tyburnia. If the merits of the architecture of the Victorian period are to be judged by Buckingham Palace and Osborne House, or even by the buildings covering the Westminster property Belgravia-wards, there was no reason to fear that that of the reign of Queen Anne would suffer by the comparison.

An animated discussion ensued, the prevailing opinion being that the honesty of construction characteristic of the best buildings of the time of Queen Anne was a thing which might be followed and held up for imitation with great advantage to the progress of architecture in the present day, but anything like copyism in matters of design was energetically condemned. The introduction of new materials necessitated certain modifications, and especially was this true of plate glass, which being so generally in demand by clients, was obliged to be adopted by architects. Though the dignity, repose, and comfort of the buildings of the period referred to were worthy of emulation in the present day, architects must not seek to attain such effects by mere imitation, but must rather endeavour to make progress in their art by working out and developing true principles and adapting them to modern requirements and new constructive materials.

A vote of thanks to the lecturer brought the meeting to a close.

THE BUILDING NEWS SKETCH BOOK.

CAPITALS FROM CHAPEL ROYAL, HOLYROOD.

THOSE capitals with the round abacus are taken from the south aisle, the most perfect portion remaining of the interior. They support an arcade of Pointed arches. Those with the square abacus are from the north aisle ; they form the supports of an arcade of circular intersecting arches, with the dog-tooth ornament ; they lack the boldness and the beauty of the others, and are, to all appearance, of a much earlier date.

JOHN RUSSELL WALKER.

MANCHESTER REFORM CLUB.

ONE of our illustrations this week, represents the Manchester Reform Club. The basement is to be let as stores, the ground floor as offices ; the club, starting from the first floor, will be approached by a grand central hall and staircase. The hall and ante hall to be groined, and walls decorated with terra cotta and marble columns. The grand staircase to be oak, with richly-carved balustrade, inlaid with various kinds of wood. On the first floor is a large dining-room, 80ft. long by 32ft. wide, with richly-panelled oak and pitch-pine ceiling, decorated with gilding, &c., carved oak doors and dado ; on this floor are also the strangers' dining-rooms, coffee-rooms, &c. On the second floor are billiard-rooms, card-rooms, smoking-rooms, &c.

The front and side elevations are to be of ashlar work, with polished red granite columns, and different coloured polished marbles. The contract is taken by Mr. Nield, builder, late Mayor of Manchester, for £20,000. The architects are Messrs. E. Salomons and J. P. Jones, of 21, Whitehall-place, London, and 63, King-street, Manchester.

PARLIAMENTARY NOTES.

STATE RAILWAYS IN INDIA.—On Friday last Mr. Grant Duff, in answer to Sir D. Wedderburn, said it was the intention to entrust the construction of the projected State railways in India to the Public Works Department, and he was not aware that any person could maintain that the operation of that department, in the conduct of works carried out by its means, had not been entirely satisfactory. With regard to the second question, he did not know the reasons which had induced the Government of India to select the particular engineering officers whom they had selected for their railway works. The Government at home did not interfere with the discretion of the Government of India ; but the present Government of India had so great a stake in the completion of the line that there was every reason to believe that the very best of officers would be selected. As to the third question, the transmission of the materials required from England for the projected State lines, through the medium of the Store Department, was under consideration.

THE TREES IN THE PARKS.—Mr. Eastwick, on Thursday week, asked the First Commissioner of Works if he had observed that a number of elms, oaks, beeches, and plane trees in Kensington Gardens and St. James's Park had been maimed and decapitated so as to have become a deformity instead of an ornament in the public parks ; and whether he would give orders to prevent this process in future, and replace the mutilated trees with young plants.—Mr. Ayrton, in reply to the question of the hon. member, was afraid that the trees in the park were not exempted from the law of nature under which trees in general flourished and decayed, and he entertained the opinion that when a tree exhibited signs of decay it was better to lop off the decayed branch rather than cut the whole tree down ; and that treatment had the advantage of preserving the rest of the tree for a considerable period. He was afraid that no better course than that he had indicated could be pursued, unless the hon. member could point out some way to make the trees everlasting.

THE SITE OF THE MINT.—Mr. J. B. Smith inquired of the Chancellor of the Exchequer, as the prospective Master of the Mint, whether Her Majesty's Government had any intention of removing the Royal Mint from its present site at Tower-hill.—The Chancellor of the Exchequer—I hope I may answer my hon. friend's question without assuming a title which I do not possess. We have five acres of land on Tower-hill, occupying what we may call a most eligible situation ; one acre only of it is taken up with Mint buildings, and the other portion is occupied by a very excellent tenant, Sir Anthony Rothschild, for purposes of refining. We think it is a waste of public money to keep this large tract of land, and we hope to mature a plan for moving the Mint rather more into the centre of London ; and when we do so we shall be very happy to sell this exceedingly eligible allotment of land for a suitable price.

TRAMWAYS.—On the motion of Mr. Shaw Lefevre, the following members were on Monday appointed a select committee on the Tramways Bill :—Mr. Shaw Lefevre, Colonel Wilson Patten, Mr. Ayrton, Mr. Sclater-Booth, Mr. Dent, Mr. Cawley, Mr. Hibbert, Lord George Hamilton, and Mr. Loch ; with power to send for persons, papers, and records ; five to be a quorum.

HYDE PARK.—The Earl of Albemarle appealed on Tuesday in the House of Lords to the noble earl the Secretary for the Colonies to use his influence with the Board of Works in order that some gravel might be laid down on the west side of the road in Hyde Park, parallel with Park-lane, as was done last year. He did not know whether the First Commissioner of Works was a horseman—(a laugh)—but if he would ride a "groggy" horse at a smart trot from the Marble Arch to the Wellington statue he would see the reasonableness of a request which he preferred on behalf of equestrians generally, not omitting the noble earl himself. (A laugh.)—Earl Granville believed he had met his noble friend in the park that morning, though not, he thought, on a "groggy" horse. (A laugh.) He should have great pleasure in informing the First Commissioner of the remarks of his noble friend, and hoped his request would be acceded to.

HOUSES OF PARLIAMENT.—Mr. Cowper-Temple moved in the House of Commons for copies of all reports received at the Office of Works from chemists or architects on the results of experiments made for preventing decay in the stone of the Houses of Parliament (in continuation of Parliamentary Paper, No. 487, of Session 1867-8) ; and also of correspondence between the First Commissioner of Works and Mr. Edward Barry, during the present year, respecting his duties as architect of the new Palace of Westminster. The motion was agreed to.

POLLUTION OF RIVERS.—Colonel Gray asked the Home Secretary when the report of the Rivers Pollution Commission would be issued, and also whether it would be explained how the said report had been in the possession for some days of other persons, though not yet in the hands of members of the House of Commons. Mr. Bruce said the report had been printed for some time, and would shortly be in the hands of members. He had made inquiries into the point referred to in the second part of the question, but was unable to discover anything about the matter.

PATENTS FOR INVENTIONS.—Mr. Macfie gave notice that he would on that day (Tuesday) four weeks, move for a Select Committee to consider and report on the laws relating to letters patent for inventions.

THE Liverpool Improvement (No. 2) Bill and the Sheffield Water Bill were read and discharged on Wednesday, both having been withdrawn.

ARCHITECTURAL SOCIETIES.

EDINBURGH ARCHITECTURAL ASSOCIATION.—The usual fortnightly meeting of the Association was held on Wednesday week, Mr. Thomas Ross, President, in the chair. The minutes of the previous meeting were read and approved of, and several new members elected. The business of the evening was a resolution moved by Mr. Wm. Beattie, architect, and seconded by Mr. Archibald Sutter, civil engineer, viz. :—"That the different methods followed by surveyors in the measurement of work is productive of inconvenience and loss ; and that, in the opinion of the Edinburgh Architectural Association, a uniform system of measurement should in future be adopted by all surveyors." In supporting this resolution, Mr, Beattie pointed out the evils resulting from the present want of uniformity to the architect, the contractor, and to the public generally. He advocated a more detailed and analysed system of measurement, and that the old practice of allowances should be entirely discontinued, and nett quantities universally adopted. He contrasted the English and Scotch systems of measurement, and stated that the former was more minute and detailed in its dissection of the work.—Mr. Ormiston, surveyor, criticised the remarks made by Mr. Beattie, and an animated discussion followed, in which Messrs. Paterson and Ross, architects, and Messrs. Lawrence and Russell, surveyors, took part. The resolution was unanimously adopted, and in view of the interesting and important nature of the subject, it was resolved to call a special meeting at an early date to take some practical steps in the matter.

Furniture & Decoration.

ON SURFACE DECORATION *

So much attention has been paid, and so much skill has been employed in producing copies of nearly every kind of work; so many prizes have been awarded in this room and elsewhere in abundance, that I think it well occasionally to look around and see what success has attended so much labour, and what advance towards perfection has been attained. It is not an easy task to confine oneself to one subject, but I propose to describe a few modes of treatment, which to me seem correct, for decorating ceilings, walls, windows, and floors, to which I beg your indulgent attention.

In the first place, I remark, in all cases we should not only allow, but invoke, the aid of Nature to assist us, carefully studying her varied beauty of form, her richest luxuriance of colour. We cannot exhaust her treasures by the most diligent research or careful study, and the more we examine her beauties the more we shall be lost in amazement, but we shall find that nothing natural, either in form or colour, can ever be positively ugly or incorrect. There are many objects we individually like and dislike, but it is quite possible that as the colours we think most beautiful are unseen by one who is colour blind (and there are many such), so natural forms we dislike exceedingly may be highly appreciated by others, who see great beauty in them; some of you, I have no doubt, take as much care of your specimens of ferns as others of the choicest roses.

CEILINGS.

The decoration of ceilings appears in the present day to receive but little attention; they are too often apparently forgotten. The floor is covered with the softest carpet, glowing with colour; the walls hung with richness and ornamented with pictures and mirrors; the windows festooned with brocade, and the ceiling but too often looks like a white sheet, covering up the whole, to keep the dust from the furniture. Formerly, ceilings received a great amount of consideration, some beautiful examples of which still remain. Many of the Italian palaces contain ceilings which were painted by the first masters of the day; noble productions, bold, effective drawing, and glowing with richest colouring, worthy of being visited and admired now, after more than two or three centuries have passed. The ceiling of the Chapel Royal, S. James's, was a proud effort of Holbein's skill, which he painted in 1540, and which was admirably restored by Sir Robert Smirke about thirty years since. In Paris we find many grand ceilings, especially in the church of the patron, S. Genevieve, which was begun by Monsieur Gros, by order of the Emperor Napoleon, in 1813. It was afterwards finished, with certain alterations to suit the Bourbon dynasty. I shall not easily forget the effect it had upon me; the clever arrangement, the excellent colouring, the magnificent scale of the work, the surface covering a space of 3256 square feet, combined with the vast area of the building, create an impression not easily effaced. The artist had £4000 for his work, and was created a peer of France by Charles X., to show his appreciation of the merits of this great artist. Here in London, upon the dome of our metropolitan cathedral of S. Paul's, for the admiration of our foreign visitors, we have a make-believe arcade, with sham architectural features, mouldings, cornices, pilasters, balusters, niches and figures, painted in sham-shadow colours. Is it possible that our artists can ever hope to be created peers of the realm if they only receive such commissions as these?

Many beautiful old ceilings are coved and formed in panels, generally a large centre, perhaps a circle, or an oval, surrounded by smaller compartments, enriched mouldings framing the whole work; the surface of the panels filled in with scroll work of different designs, either modelled separately or worked in fine plaster on the ceiling itself (a method I should very much like to see carried out again), forming its own light and shade, and, when enriched with colour and gold, cannot be surpassed. The beauty of the arrangement and colouring, by Mr. Owen Jones, of the stalactite roof in the Alhambra-court, at Sydenham, was very great, and I extremely regret its loss through its unfortunate destruction by fire a year or two since.

One of the best stucco ceilings I recollect is the ceiling of the staircase leading to the picture-gallery at Wentworth Castle, Yorkshire; a good plain example is the ceiling of the great hall of S. Bartholomew's Hospital, in Smithfield; and one of the best painted ceilings is the beautifully designed and painted nave of Ely Cathedral, by the late Mr. Le Strange and Mr. Gambier Parry.

The thanks of every lover of colour are due to Sir Sidney Smirke and Mr. Willemens for designing, and the Benchers of the Temple for their liberality in allowing the design to be carried out so successfuly upon the ceiling of the Temple Church It was the wonder of my early days, and is still a treasured delight. I have ever considered it a great step in advance, and after all that has been done in this great city, until the recent decoration of the staircase of the Foreign-office and S. Stephen's Crypt, at Westminster, I cannot refer you to anything better.

Flat ceilings should always be a shade of silver grey or blue, more or less warm or intense in colour as the size of the room or use of the building should suggest, which may be ornamented with shades of the same colour, or white, or red, or gold. Look at Nature. Mr. Crace has told us, in this room, "she never errs." Her harmony is always beautiful, "ever perfect." The canopy of nature, the sky, is always of that tint, sometimes very pale, sometimes intensely blue, sometimes ornamented with soft tinted clouds, appearing like floating silver, sometimes sprinkled with myriads of stars, and sometimes literally blazing with glowing tints of vermilion and gold. Mr. Colling tells us that ceilings should appear "light and elegant, anything that is agreeable, so long as it is kept light, rather than the ordinary and vulgar whitewash." He says:—"Our whitewashed ceilings are a remnant of barbarism, handed down to us from our Puritan Fathers, the same who were so fond of beautifying our churches with their indefatigable whitewash brush." Blue is always best used as a ground colour. It seldom looks well in lines or small objects. We are so accustomed to see it in such quantity in nature in the sky above us that it seems scarcely to be sufficiently represented to look proper when in small objects. How very rarely do we see a perfectly blue flower. Red, on the contrary, should never be the predominant colour. It should be used sparingly upon surface, or diapered with dark colour or gold. It may be most successfully used in lines and backgrounds of enrichments, and is always a pleasing addition.

Great effect is produced and good taste displayed by enrichment with contrasting colours and gold, but treating the whole as a flat surface, never, under any consideration, painting ornament in shadow colour to appear as relief. Simple lines and stencilled ornaments are sufficient modes of decorating any flat ceiling, and by properly modulating rich colours, the whole work may be decorated satisfactorily, and exhibit good taste, too. At Addington, the seat of Mr. Hubbard, the ceilings have been decorated, under the direction of Mr. Owen Jones, in this manner with great success.

WALLS.

I will now direct your attention to wall decoration. As the surface in most apartments is considerable, and meets the eye on every side, I think it worthy more consideration than it seems to receive; and that its adornment is seldom cared for as much as it should be. We will suppose a case. You have built or purchased your house; then you think of its decoration. You perhaps go to your decorator without your architect, perhaps without even seeking his advice upon the matter. You see an immense variety of decoration, hangings, and paper patterns—every colour, every style—in such mingled variety and mixing of form, that you get tired and say, perhaps, "I will have this or that," the consequence being, too often, your choice is unsuitable. Probably you choose a brown and gold paper for the dining-room, where everything should be rich and exhilarating; grey or white and gold, with some exquisitely-drawn device, for the drawing-room; perhaps a green chintz for a bedroom with north aspect, a pink diaper for one facing south; and, to crown all, a most bilious-looking marbled paper for the whole of the surface of the entrance hall and staircase, from top to bottom of the house *ad nauseum*, and there the matter ends. But, now, is it not too often unsatisfactory? The dining-room walls look as if covered with brown paper, similar to what you lay under the carpets, with a stray leaf or two of gold here and there, which appears to have been blown in at the window, and adhered by accident upon the wall. The drawing-room walls look cold—no colour, no effect in them; and the elegant object which looked so well in the hand, is quite lost upon the surface of the wall. Perhaps you have it covered with another. If you do not, you are sure to say, "Well, I will certainly choose a different kind of pattern next time." The bedrooms, too, are unsatisfactory; and the staircase a monstrous sham. You get an effect, more or less, of marble for £20 or £40 upon a surface which would cost forty times that amount, if only cased with marble half-an-inch thick; besides which, marble is unsuitable to our cold climate. And who would choose a yellow marbled paper for a good house, when you may see it in every brick house built in the outskirts of this city which is let for £40 per annum?

Many of the old patterns which were prepared for staircase walls, a few years since, were in imitation of Gothic traceried windows, with a perspective aisle leading, perhaps, to a cowshed, or opening to a beautiful river view, with a man or two in a boat fishing, and sometimes swans swimming proudly along; sometimes representations of blocks of granite with chamfered edges, and real sparkling glass introduced for effect. In bad taste, as they certainly were, I equally deplore the lack of taste exhibited almost always in choosing yellow marbled paper now.

The walls of the staircase, if divided into panels and decorated with different-coloured marbles and inlay patterns of geometrical arrangement, may look well; but certainly not in such quantities of one colour as is generally seen. Staircase walls, if painted a light grey, either in encaustic or distemper, and ornamented with some simple stencilled device in marone, would look well, and be quite a foil to the richer decorations of the rooms. Where paper is used, any simple pattern, not too often repeated, printed in chocolate or self-colour, dark, on any light ground, would, in my opinion, be much better than any imitation of marble could possibly be, and, if desired, could be as easily prepared and varnished as marbled paper.

(To be continued.)

* Read before the Society of Arts, March 16, by William Pitman, Esq.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

The ordinary general meeting of the above Institute was held on Monday evening last, when the chairman (Mr. Charles Barry) announced that the liberal donation of £100 had been received from the president, Sir William Tite, in augmentation of the travelling fund of the Institute, and a letter from Professor Ansted was read, in which that gentleman briefly tendered his services to deliver occasional lectures before the Architectural Art Classes, now in process of organisation under the auspices of the Institute, the Architectural Association, and other cognate bodies.

Mr. Herbert Ford, of Aldermanbury, and Mr. Charles Smith, of Reading, having been elected fellows, the meeting was then made special to consider the recommendation of the council with respect to the award of the Royal Gold Medal, the Soane Medallion, and other medals and prizes of the Institute for the year 1869-70, when on the motion of Mr. T. H. Wyatt, seconded by Mr. J. H. Good, the Royal Gold Medal was by the unanimous vote of the meeting (subject to Her Majesty's sanction) awarded to Mr. Benjamin Ferrey, F.S.A.

The other medals and prizes were awarded as follows:—

The Soane Medallion, with the sum of £50, under certain conditions, to Mr. Ernest C. Lee, of 15, Great James-street, Bedford-row, who was the successful competitor for the Pugin Travelling Studentship this year.

The Institute Silver Medal, with £5 5s., to Mr. Edward J. Munt, of John-street, Adelphi.

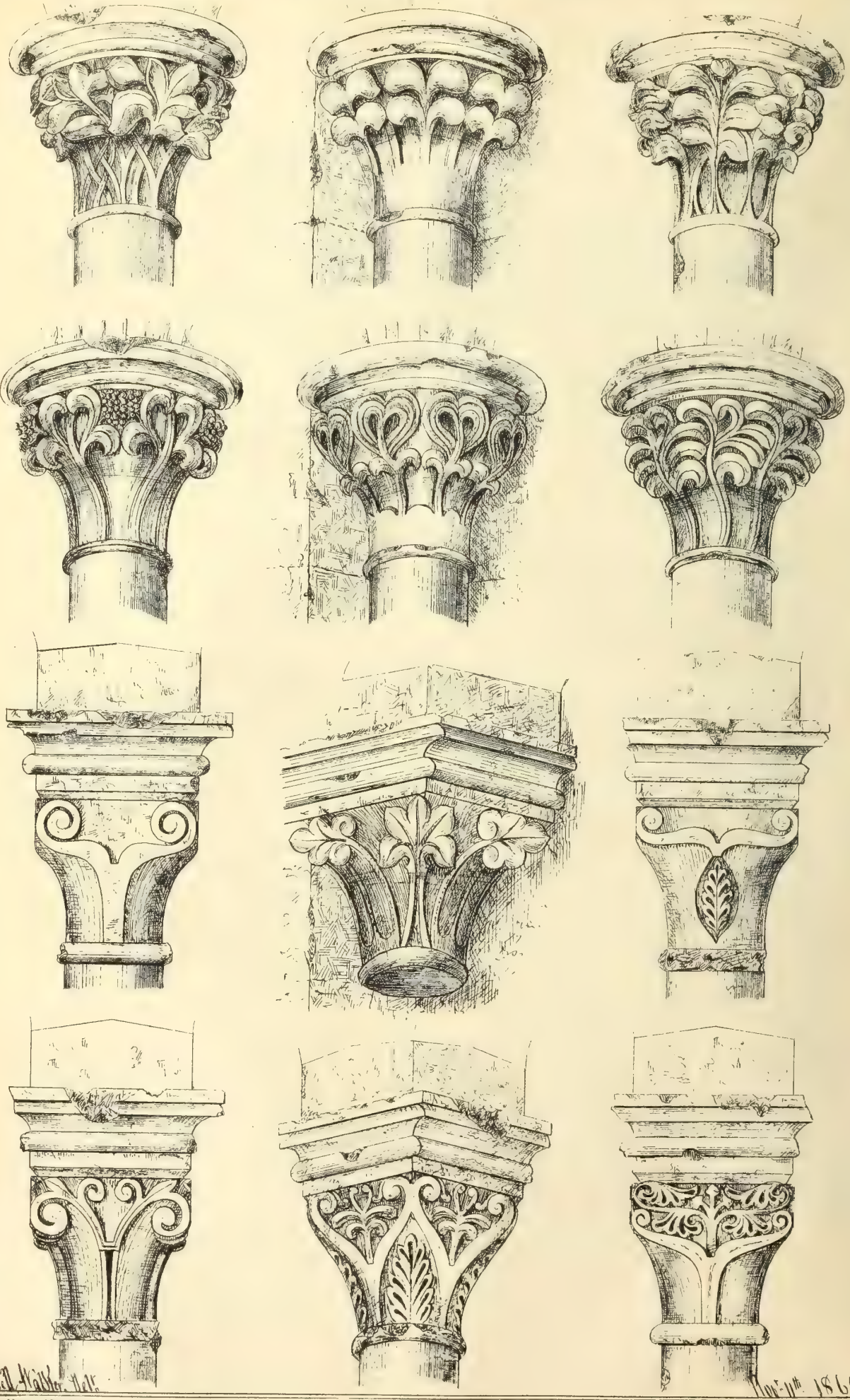
Medal of merit in the same competition, to Mr. A. Hill, of Cork.

The Institute Silver Medal for essay, to Mr. J. Huskisson Guillaume, of Marland Place, Southampton.

Student's Prize in Books, to Mr. Adolphus Came, of Great James-street, Bloomsbury.

The list of subjects prepared by the Council for the medals and prizes of 1870-71 having been agreed to, the meeting adjourned till the 28th instant.

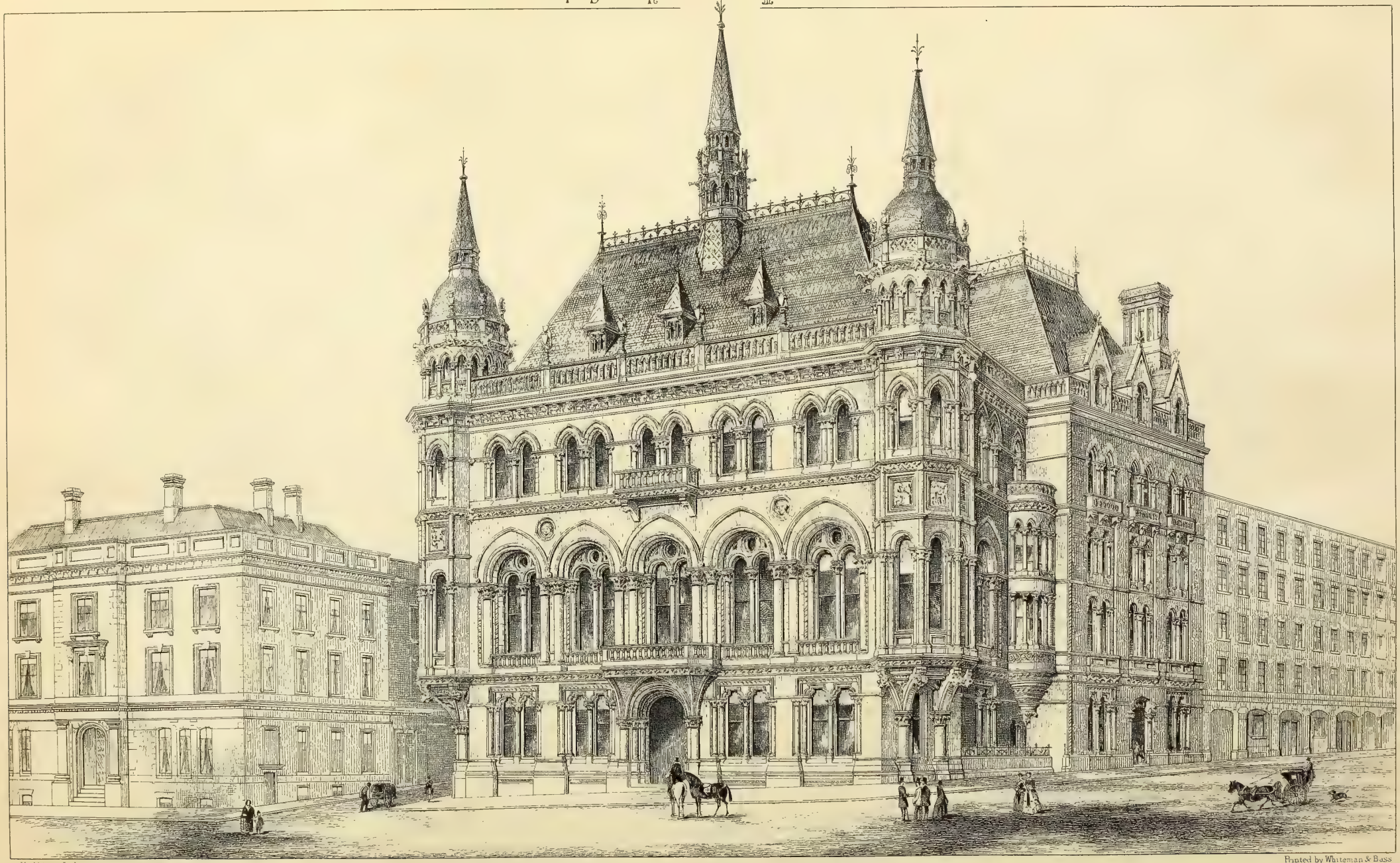
Capitals. Chapel. Holyrood.



John Russell Walker. Del.

Nov 1st 1869.

Photo-zincographed at Messrs. A. Bros. London



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MANCHESTER REFORM CLUB.

MESSERS E. SOLOMANS AND I. P. JONES, ARCHTS

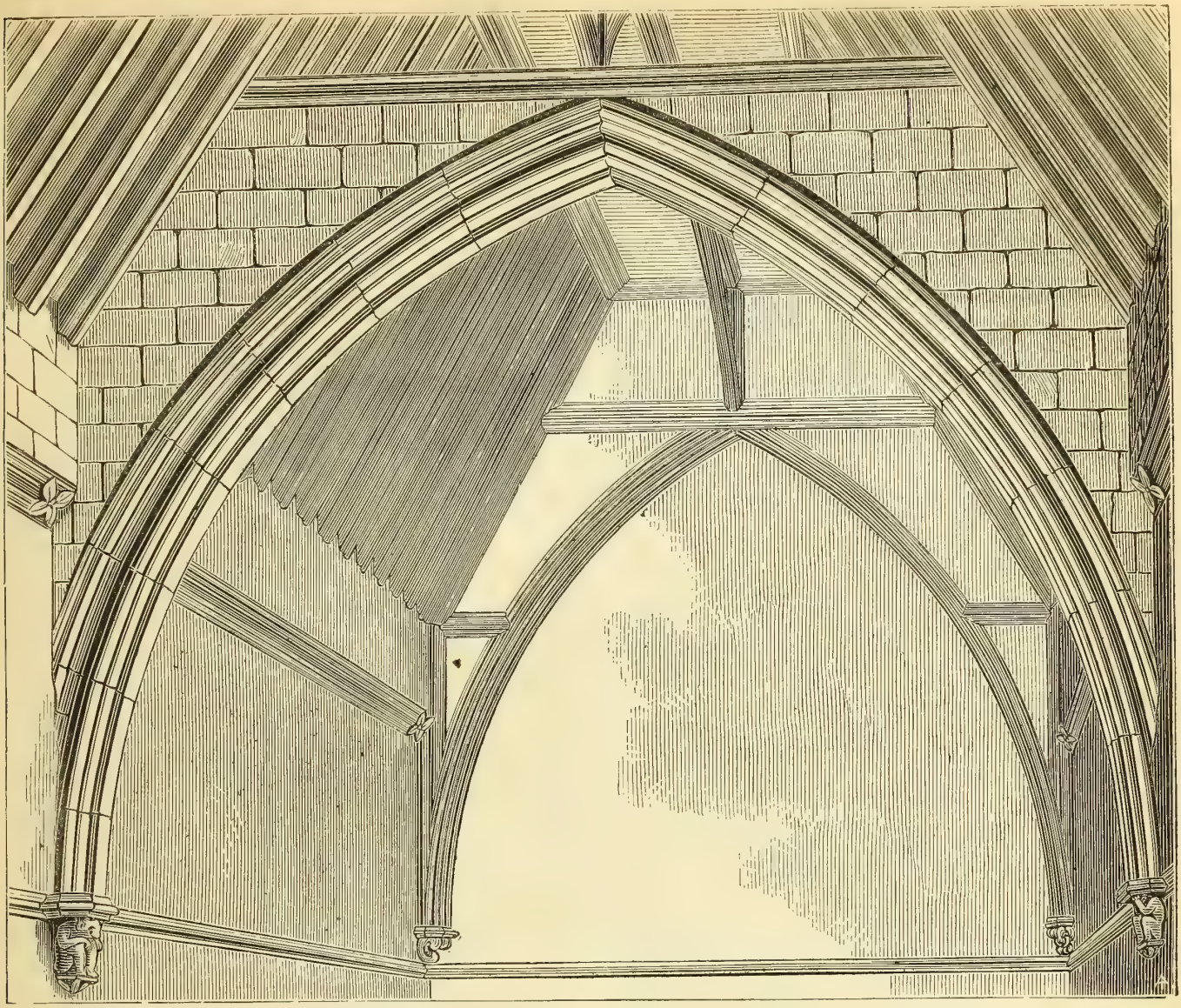


Fig. 5.—Hall Roof of the Mote House, Ightham.

BRIEF CHAPTERS ON CARPENTRY.

By Thomas Morris.

(*Continued from page* 189.)

THE Mote house, about two miles from Ightham and four from Sevenoaks, is an edifice respecting which the professed topographers, Hasted, Moule, and Lewis, are remarkably incommunicative, but guided by Mr. J. Russell Smith's "Bibliotheca Cantiana," I have met with some interesting particulars in the "Gentleman's Magazine," 1835 and 1837. The writer, M. A. J. Kempe, derives the name of the parish from *izzad*, the Saxon for island, in reference to the position of this, the principal building within it. It was, indeed, a romantically situated fortalice, concealed by woodlands, in a deep ravine; and the waters of a rivulet flowing round the enclosure supplied the moat from which the name is taken.

There is no record of any great military adventure here, but the site was occupied at an early period of the Anglo-Saxon dynasty. Ivo de Haut had it in the time of Henry III., and it was long held by owners of that name. To this reign the original parts may be referred, and they are probably the work of Sir Piers Fitz Haut. The place altogether is a good specimen of the fortified house of a knight in the fourteenth century.

Passing under the gate, we enter the court, in front of which is the object we are in search of—on account of its gabled roof—the hall. The interior furnishes one of the animated scenes in Nash's "Views of English Mansions," but instead of the mere arched rib of stone there represented, Mr. Railton (to whose pencil I am frequently indebted) found the arch and gable solid up to the cross-string, as now engraved. "The roof of the hall," says Mr. Kempe, "has undergone some alteration, but at either end two of the acutely Pointed arches remain." The alterations here referred to (including the introduction of a large window), are assigned to Richard Haut, in Henry the Seventh's reign. The method of supporting the middle of the rafters is not shown, but may be judged of from other instances that will be introduced.

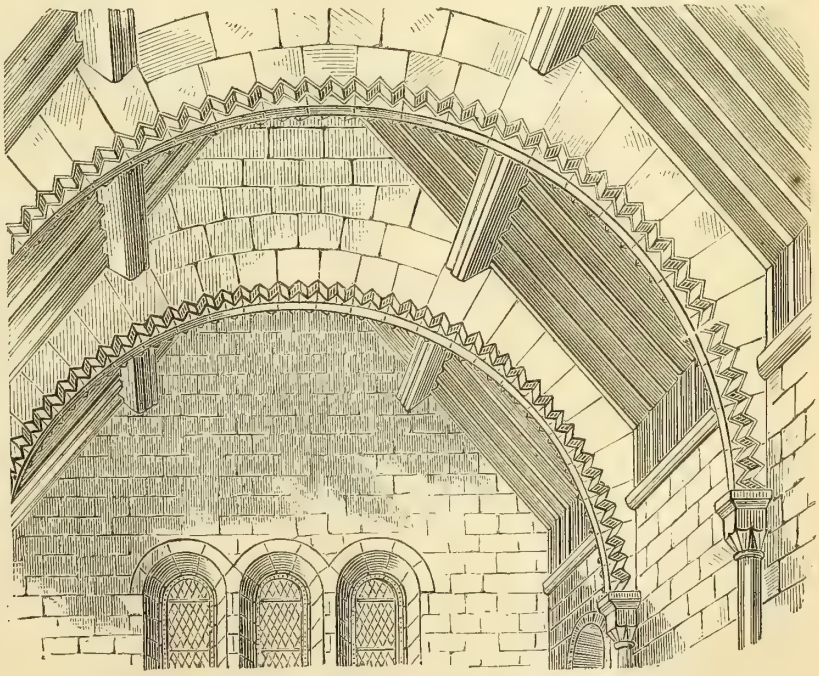


Fig. 6.—The Chancel, Bedlington, Durham.

Perhaps the finest example of gable roofing was at the Archiepiscopal Palace of Mayfield, Sussex, once the home of S. Dunstan, and where his reputed tongs, hammer, and anvil, were long preserved. Mayfield was attached to the See of Canterbury till the time of Henry VIII., and was then relinquished to the Crown by Archbishop Cranmer. The King granted it to Sir Edmund Worth, and from him it passed into the occupation of Sir Thomas Gresham. It was dismantled about A.D. 1730. The hall was 68ft. long, and 38ft. broad. "The lofty stone arches which supported the roof are left standing, not," says Nichols ("Bib. Topog. Brit."), "with any intention of showing to posterity its ancient grandeur, but because the materials were judged inadequate to the expense and danger of taking them down." They give to the ruins, he adds, "a most venerable and picturesque appearance." The erection of this hall seems attributable to Archbishop Islip, 1349-66, who is accredited with munificence and architectural taste. Besides his works at this favourite residence, he expended large sums on the palace at Canterbury, on the house at Maidstone, and in founding Canterbury Hall, Oxford, now part of Christ Church, and remembered in Canterbury Quadrangle. Dean Hook found but scanty records of his private life, but he is supposed to have been of noble stature, and an active public-minded man, taking a due share in the important events of his time. He was, however, an invalid for several of his latter years. Travelling (of course on horseback) towards Mayfield in January, 1362, he was thrown in a watery place and thoroughly drenched; but continuing his journey and neglecting even on arriving at the Palace to change his raiment, he fell asleep (*in quadam lapidea camera*), and after dinner had a stroke of the palsy. A great proportion of the edifice no doubt continued of timber, and the stone room was probably the one just considered. Buildings of wrought stone were always deemed of consequence—the name of a part of the Saxon palace at Westminster is preserved in "Whitehall;" and the principal feature of London's ancient fortress is the "White Tower," both so named, it may be presumed, from the whiteness of their constituent stonework. After the above severe attack, Islip resided alternately at Canterbury and Charing; but died at Mayfield on the morrow of S. Mark, 1366.

The hall had probably a recessed fireplace and flue, since a mantel in another room is dated 1371, only five years after Islip's death, when his nephew Wittlesey, succeeding Langham, had obtained the see. It was so at Ightham, of which Mr. Kempe says "huge timber logs, placed on andirons, still blaze in the capacious chimney of this most venerable hall." The arches at Mayfield have nearly the same curvature also as those at Ightham, and in the former the places of the supports for the rafters are apparent, but as I give one of these examples it is needless to reproduce the other. Mr. Street has supplied to the "Transactions of the Institute," 1864-5, views to show the remains and probable perfect condition of the palace hall. "It appears to me," he remarks, "to be one of the most noble designs it is possible to conceive." No tribute of admiration could be higher than this; and it comes, let it be remembered, from one whose observation has been very extensive; who, like an energetic soldier, has followed his vocation unimpeded by family ties or home attractions, and can say, "I learnt my art by walking about England with a knapsack on my back."

As a modern instance of this kind of construction, I mention the chancel of Bedlington Church, Durham, a solid little work of Norman character, where Mr. Railton supported the roof with arches and gables of stone, as represented in fig. 6.

This engraving serves a second purpose. It was, I venture to assume, by exactly such arched ribs that the nave of Saint Peter's, Northampton, built by Simon de Saint Liz in the time of the Conqueror, was, as already intimated (page 188), intended to be spanned, though with more elaborate detail, it may be, to accord with the rest of that rich and interesting edifice.

Here I propose to turn from the masonry of early times to contemporaneous works in timber, convinced that the true principles of British Carpentry can never be fully comprehended except through an acquaintance with the methods of masonic construction that constitute their very foundation.

The degree in which these principles had been mastered by our ancestral architects left them under great restrictions in design and the forms of ancient edifices were often ill adapted to the wants of the projectors; but advancing science has found it difficult to invade arrangements that time has countenanced and custom sanctified.

Building Intelligence.

CHURCHES AND CHAPELS.

BUTTERSHAW.—On Wednesday week a new Congregational Chapel was opened at Buttershaw. The chapel, which is in the Gothic style, was designed by Mr. Pritchett, of Darlington. All the windows have coloured glass. Accommodation is found for 450 persons. The cost of the building will be about £2450.

UPPER EASTON.—The new church of S. Gabriel, at Upper Easton has just been consecrated by the Lord Bishop of Gloucester and Bristol. It is built almost entirely of brick, from designs by Mr. J. Neale, of Clare-street, Bristol. The length of the nave is 70ft. by 29ft., the transepts are each 26ft. by 20ft., and the dimensions of the chancel are 26ft. by 29ft. There are also vestry and organ chambers. The tower, which is on the south side of the chancel, is 90ft. in height, and has angle turrets and a short slate spire. There is a gallery at the west end of the church for the use of the school children. The building will accommodate about 700 persons. The entire cost is about £3000. The builder was Mr. J. P. Stephens, S. Paul's, and the carved work was done by Mr. H. T. Margetson, Stapleton-road, Bristol.

BUILDING.

BIRMINGHAM.—The new building erected for the Town and District Bank, Birmingham, has just been completed. The style is Lombardic-Venetian, free treated. The front of the ground floor is boldly rusticated, and has circular-headed windows, with moulded and enriched architraves springing from moulded imposts. The first and second floors are alike in character, having circular-headed windows, divided by panelled pilasters, but each floor is differently treated, both as regards the ornamentation and the moulded work, each storey being fairly marked out by boldly-moulded string courses, that serve also as sills to the windows. The attic storey is lighted by oval lunettes, arranged in a panelled frieze, and the whole front is terminated by a bold and massive modillion cornice. The banking hall, which is the most important feature in the erection, is 65ft. long, 35ft. wide, and 33ft. in height, the general style being Italian. The building has been erected from the designs of Mr. Yeoville Thomason, of Birmingham, by Messrs. Hardwick and Son; the ironwork of the strong room by Messrs. Milner; the whole of the work was carried out under the superintendence of Mr. Caveler, who officiated as clerk of the works. The entire cost of the building was between £11,000 and £12,000.

ARCHITECTS' BENEVOLENT SOCIETY.—The annual meeting of this society was held on Wednesday week, at No. 9, Conduit-street. The Secretary, in his report, stated that the total receipts for the year, including a balance of £95, had been £419 13s. 11d., and the expenditure, including £105 given for relief and £88 invested, had been £345 16s. 4d., leaving a balance of £73 17s. 7d. The invested fund now amounts to £1557.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

RECEIVED.—J. P. S.—J. S.—J. B. F.—J. R. A.—W. R.—J. H. T.—W. S.—C. R.—J. R.—F. E., jun.—T. S.—M. and Co.—J. L. W.—H. H. G.—W. B.—R. H. C.—C. H. B. H.—P. M. and Co.—H. Tennant—C. Goodchild—J. H.—J. A. L.—C. R. W. H. T.

WM. GUNTON.—We know of no such work.

GEO. HOLFORD.—The sketch came to hand.

W. E. CLEATON.—Several other answers to query 1779 have appeared.

A CITIZEN OF LONDON.—Too late.

ERRATUM.—In article on "Our Domestic Fireplaces" last week, on page 185, second column, line 51, for "constructing" read "contracting."

Correspondence.

DR. ZERFFI AND THE HISTORICAL DEVELOPMENT OF ART.

(To the Editor of THE BUILDING NEWS.)

SIR,—Having read "P. E. M.'s" statement that he has been engaged for many years in the service of the Art Triad, Painting, Sculpture, and Architecture, I feel myself bound to take some notice of the two letters in which he attacks my historical accuracy, basing his criticism on a condensed report of three lectures delivered by me at the Haldane Institution of Fine Arts, at Glasgow.

He takes every word of my reporter for granted, and accuses me of having concocted a "tissue of falsehoods," talked "sheer nonsense," made "blunders," propounded "strange assertions," propagated "flagrant errors," enunciated "enigmatical theories," and started "fanciful hypotheses," a string of accusations which would have been more than sufficient to burn a man in the glorious artistic times of the Inquisition.

I could settle the whole of the dispute in a very short way, and cause "P. E. M." to appear a doleful Don Quixote, fighting against windmills, by simply stating that I never made any of the assertions which he so chivalrously attacks; or that I cannot be made answerable for the "bare outlines" of my lectures, given in a report. Supposing I had stated, "Jews are *generally* picture dealers, but rarely sculptors or painters; that they are excellent grammarians, philologists, poets, critics, and musicians," "P. E. M." would look very foolish with his rhodomontades, with his comical attitudinising before the readers of THE BUILDING NEWS, with the envious leer in his lines crying out, "No connection with the shop over the way." But my reporter (who is altogether unknown to me) has shown so much knowledge and genuine good taste, that I shall stand by him, and treat the matter as if he had reported the *ipsissima verba* I spoke. The thousands who listened to my lectures at Glasgow, and the hundreds to whom I lecture week after week in London, will bear me out when I say that I never professed to be a "Gog or Magog," that I continually encourage my students not to take any kind of hypothesis or theory for granted, but always to investigate whether hypothesis and theory are *established by facts*, and concerning facts, I advise them to be very cautious, and to accept as such only those which are based on the most trustworthy historical authorities.

Had "P. E. M." done me the honour of attending my lectures on the Jews, he could have convinced himself that I based my statements on the very highest authorities. My information was taken from Holy Writ, Bohlen, Ewald, Hirt, Meyer-Schulze, Winkelmann, Ben David, Rabbi Manasseh Ben Israel, Kugler, and Lübke. Now all these authorities substantiate my views. Not in one of them do I find the assertion that the Jews had an art of their own; not one of them contradicts the second commandment of the Decalogue, which "P. E. M." says that only "Protestants term so," as if the Jews had altogether a different Decalogue. But I have studied some of the distortions, garblings, omissions, and arrangements of different religious sects in holy matters, and I know that there are people who handle the words of any sacred book just as it pleases them. To enter into a controversy of this kind is not my province. I lectured at Glasgow on Art, and had nothing to do with Protestant or Romanist, High Church or Low Church opinions on the second commandment. I quoted the law of the Jews as the *cause* of a well authenticated *effect*, that they had no art of their own, and there my duty as an

historian was at an end. The very highest authority of the Jews, their Scriptures, enact, "*Thou shalt not make unto thee any graven image* (this passage settles sculpture as far as idols are concerned), or *any likeness of anything* that is in heaven *above*, or that is in the earth *beneath*, or that is in the water *under* the earth." (The italics are this time mine.) After so clear a statement of the three dimensions, in which anything, whether man, woman, animal, plant, fish, or protoplasm, may exist, I ask "P. E. M.," what was left to the Jews to carve and to engrave? But I was not satisfied with the stern and inexorable law. I wished also to know how the learned doctors of the Jews understood it, and I found that one of the most eminent of them, Rabbi Manasseh Ben Israel, says: "That all those things which are esteemed holy in the presence of God, or idea of man, may not be imitated in any known form or shape, *although made without the intention of adoring them.*" I really must beg "P. E. M.," before he attacks anybody again with so much modesty and courtesy, to spend a few hours in the British Museum, or in any of the elementary historical classes, where he might make himself acquainted with the very first principles of discussing scientific matters in a scientific manner. The laws of the Jews enact, and the Jewish commentators of these laws understood it so, that the Jew should not occupy himself with art, and the result was: "*that the Jews had none;*" and all the arguments of "P. E. M." will not give the Jews of the East a special art of their own.

The most remarkable feat of logical perspicuity in "P. E M." is where he says (see BUILDING NEWS, March 11th, 1870, page 202)—"The ancient Jews did certainly not distinguish themselves in art as greatly as did other nations, and for a very sufficient reason." Your readers will scarcely believe that, after this introduction, "P. E. M." comes to the same conclusion, which, drawn by me, he calls a "tissue of falsehood"; for he continues thus: "In other nations, Architecture, Sculpture, and Painting were all developed and brought to excellence in the service of religion, the erection and fitting up of places of worship. But the Jews had no temple until Solomon's time." The question for an inquiring mind must be, *Why not?* And the natural answer would be, because the law commanded them to have only a *tent*, and it was necessary for the Jews, in order to set about constructing the Temple of Solomon, to have a new and special Divine commission, which certainly does not prove that they had a great love for building. We may convince ourselves that the very contrary was the fact if we compare with their architectural productions the marvellous temples of Egypt, the rock-hewn sanctuaries of the Indians, and the magnificent sacred edifices of the Greeks, of which I may mention the Temple of Diana, at Ephesus, which had been already once burned down and rebuilt about a century before the Jews received the Divine Commission to build their one single Temple. "P. E. M." himself states, "that this ONE only was allowed." If only *one* was allowed, is that not a prohibition to build others, and does that look like an encouragement from the Most High to develope Architecture? O Sancta Simplicitas! "P. E. M." admits further that "religion with them gave no stimulus to the Fine Arts." I ask any unbiassed reader of THE BUILDING NEWS whether I did not make the same statement, only in somewhat different words, and whether it is fair and reasonable that I should be taken to task for it by my logical critic?

"P. E. M." has a very objectionable mode of quoting even the "bare outlines" which my Glasgow reporter sent to your paper. In explaining how it came that the Jews had a horror of building, I assigned as a cause not only their Semitic nationality, but also their bondage in Egypt. With regard to their nationality, I may observe that they were a mixture of the three groups of the human race: the Black, Yellow, and White. After a certain time they repudiated all intercourse with other surrounding races, and thus formed a distinct type, with a facial angle on an average of 85°, and an average amount of brain of about 85½ cubic inches, (the Aryans having an average of 92 cubic inches of brain). This Semitic type certainly has nowhere distinguished itself by great Architectural works and enterprises. With regard to their bondage in Egypt, where the Jews were employed in making bricks for their taskmasters, and roll heavy stones about, as may be seen on many Egyptian and Assyrian slabs, on which the Jewish type is unmistakably recognisable in those who had to perform the lowest offices of beasts of burden, I observed that this condition was anything but favourable to the development of a taste for building in the freed Jews. "P. E. M." says "that they had to bring great stones, cosly stones, and hewed stones to lay the foundation of the house," and calls these journeymen *Solomon's builders* (these are his italics), and assumes that they were Jews, and as great architects as those of Hiram or Huram. I doubted this assertion, and found in Holy Scripture that the thirty thousand carpenters, the eighty thousand stone-cutters, the seventy thousand journeymen, and the three thousand six hundred overseers were all *tributary strangers*, whom David had conquered. See Chron. II., chap. 2., v. 2, 16, 17, and 18; so that as far as the authority of Scripture goes, not *one single Jew* took part in the building of the Sanctuary. I must confess, however, that there is a difficulty in the matter; for Kings, Chronicles, Ezekiel, the writings of Josephus, the Septuagint, the Vulgate, the authorised English version, and Luther's Bible, all disagree in their details concerning the construction of the Temple of Solomon; to these may be added the host of commentators, who generally obscure the simplicity of the most simple subject. The unfairness of "P. E. M." in quoting is also evident in his trying to attribute the opinions of others to me. It was Mr. Deutsch, of the British Museum, an authority on Jewish historical matters, referred to by your Glasgow correspondent in support of my views, who stated, "that the Phœnicians had to construct the sanctuary of the Jews," and "P. E. M" insinuates "that I treated the Jews very *unfairly* in asserting such a fact."

Having only spoken of Jewish art in the East, "P. E. M.'s" list of *modern* Jewish (?) painters, amongst whom I find no Michael Angelo, Titian, Albrecht Durer, Murillo, Rembrandt, Hogarth, Turner, or Landseer, proves nothing. Had his artists lived and worked during the 580 years of national freedom which the Jews enjoyed out of the 3370 years of their historical existence, I would give in and say "Peccavi!" But he might just as well have stated that he knew *one* Jew who turned Christian, and therefore all Jews were Christians.

M. Ch. d'Henriet, in the "Revue des Deux Mondes," 15th July, 1869, says, in an article on the "Schools of Art in Europe," that the English are no artists, and assigns as cause their being Saxons. "P. E. M." finds a different cause, and says they are "Protestants," and therefore have done nothing to advance art. "In poverty of soul they are simply copyists and cribbers (?) from ancient creeds." Poor members of the Royal Academy of Berlin, with all your excellent sculptures and paintings; unfortunate artists of the Dutch School; "cribbing" R.A.'s of England, how proud you must feel after such a "testimonium paupertatis" given you by the celebrated "Triad," "P. E. M."!

Had my critic studied geography, he could not have been so angry at my stating that the Doric style originated in the north of Greece. The Aryan immigration took undoubtedly its course from the north over Thracia into Greece. If "P. E. M." will be kind enough to look at the map of Menke's "Græcia Belli Peloponnesiaci tempore," he will find that Doris lies north of Athens. Now what objection has "P. E. M." to Doris being to the north of Athens? That the Doric style was the first formed in Greece, and was stern, simple, and, as I call it, masculine, is asserted by Pausanias, Vitruvius, Pliny, Stuart, Hirt, Winkelmann, Meyer-Schulze, Kugler, Westmacott, Fergusson, Lübke, and even by any stepping stone to architecture; but it would be too much to expect such elementary knowledge from one who is in the service of an "Art Triad," and has no time to know anything of any art. "P. E. M." finds fault with me for exhorting my hearers to study the aspect of nature, and the geographical position of any country, the art of which occupies their attention. I mentioned the sea around Greece as instrumental in exciting great thoughts and expanding the mind of the people, and as affording the greatest facility for an intercourse of man with man. I never stated, "that the art of the Greeks took its origin in the sea." Everyone who looked into a class-room at any third-rate educational establishment, where the study of history is not altogether neglected, ought to be acquainted with the influence climate, food, religion, political organization, and aspect of nature, must necessarily exercise on the development of every nation. Had "P. E. M." honestly quoted what my Glasgow reporter made me say, he never could have brandished his critical shillelagh in good Irish fashion, and asked me to "tread on his coat-tail." "P. E. M" says that the Parthenon was adorned, though built in the Doric style, and forgets all about the period in which it was constructed; a period in which the Doric and Ionic styles were already melted into one, forming the Attic style, and when Greek art was at its very height. In fact, the Parthenon had, with regard to certain elements, such as the string of beads above the triglyph frieze, a touch f the Ionic style.

Concerning the statement "that neither science nor art could flourish and develop under a despotic priesthood," I may say that I have based my thesis on a careful study of history, continued for upwards of thirty years. I found that a Divine commission to construct great and magnificent buildings, and to produce works of art, was given to the Aryan nations, whenever and wherever they reached a certain climax of historical development. The questions I had to deal with were: Did art in the East develop or remain stationary? Did Greek art attain the highest development, and then degenerate? Having established these phenomena I found the origin of art in pure religious fervour, and its degeneration or stagnation in priestly despotism. Mere vituperation proves nothing. To be a practical glazier, house-decorator, or bricklayer does not make a man a competent judge of matters of art and taste. The celebrated Winkelmann, the greatest art-critic that ever lived, could hardly draw a straight line. It is very often the practical arrogance of the artistic ignoramus which prevents the real progress of art. This observation induces me in conclusion to make some remarks on the deplorable neglect of the study of history in this country. From all platforms of England, Scotland, and Ireland, we hear a venerable chorus singing the same song: "the continental artists outdo ours; they have more taste, command a better market, have, in fact, ideas in producing objects of art, whilst our artists have plenty of mechanical skill, but no originality of composition." The chorus hit on the right tune, but have any of the singers taken the trouble to investigate the cause of this phenomenon? Having been engaged in education for the last eighteen years in this country, I tried to find out this cause. The artist becomes through training and education what he is. I studied the schemes of the different Schools of Art and Academies of Paris, Berlin, Vienna, Munich, Zürich, and those of England, and compared them diligently with one another. I found that the students were everywhere taught to make strokes, to distinguish a straight line from a crooked one, to practice freehand-drawing, modelling, painting; they are taught geometry, perspective, and anatomy, exactly the same in England as abroad. I know that there are in England as many talented masters and students as in any of the above mentioned art schools and academies, and still there are no refined designers, no tasteful draughtsmen, who could in general compete with German and French artists. As to single isolated great painters, I could mention many in England, who stand their ground in originality, excellence of colour, poetry of composition, and vital truth to nature, and need not be afraid of any foreign competition. But the great total of artists, the generality of designers and draughtsmen, are still inferior to their brethren abroad. I can assign no other cause than the total neglect of one important branch of study, which is cultivated in all the above-mentioned foreign academies and totally disregarded in England, viz., the study of history. The students of the Polytechnic School at Zürich may listen to historical lectures regularly for thirty-six hours per week, under nine different professors, amongst whom are Dr. Lübke, Dr. Kinkel, Dr. Scherr, Dr. Egli, Dr. Fehr, &c. Nobody can deny that with such a training, students must have a larger range of ideas and more expanded views, because they are made acquainted with the productions of nations, the slow and gradual development of art in the works of the great masters of the past. This is the only means of transforming mere mechanics into self-conscious, thinking artists. Mind and imagination require their nourishment as well as the eye and the hand their practice.

As far as I am concerned, I hope that a *future*

"P. E. M." will first make himself acquainted with facts, learn modesty, quote correctly and reason logically before he enters the lists to break a lance with one who has fought all his life in the cause of truth.—I am, &c.,

G. G. ZERFFI.

THE LAMPS ON THE THAMES EMBANKMENT.

SIR,—In the current number of the *Illustrated London News* the public is enlightened as to what is proposed by the Board of Works in the way of gas standards for the Embankment wall. And in the interests of Art, and for national credit's sake, I hope, in spite of the puffing the design has received, that the publicity thus given to it will result in its withdrawal. Many, I doubt not, will agree with me that anything less artistic, poorer in conception and execution, it would be difficult to conceive. The whole thing, in the first place, has the character of a design for stone instead of metal; and mark, Sir, the heaviness of the base, with its clumsy cornucopias; the extreme ugliness of the centre column, with the bad modelling of the boys swarming round it, in the supposed attempt to light the lamp. I can only characterise it as a puerile conceit, badly executed. If such a design is carried out, to the disfigurement of our new and noble highway, it will be simply a national disgrace. Yet it seems certain we are in danger of it, hence my present protest. The design may be seen on the embankment, *in situ*, in juxtaposition with two others, the which, though not very attractive, are eminently superior to it. In wrought iron work we can hold our own with credit, but in cast-work we are miserably below the standard of other countries. Compare any English founder's designs with those of Durenne or Barbezat, at Paris. Ours so mindless, so common-place in design and coarse in execution; the latter displaying such wealth of invention, feeling, and *finesse*, combined with high finish. And the question naturally arises to my mind, why not apply to such firms as I have named for a design in the present case? It would be far better to be beholden to foreigners for a good design than suffer their ridicule on our native bad one. I hope, too, if it enters into the mind of the Board—the importance of a really good design—that such will be carried out with a coating of bronze, like the Paris street-lamps, so as to avoid the abominable clogging of the ever-necessary paint-brush.

Independently of its artistic demerits, it strikes me that this design has a practical fault in the facility it gives to the climbing propensities of street boys. The example in metal will only too readily be imitated by their mischievous, ill-clad congeners in the flesh.—I am, Sir, yours, &c.,

PHILIP E. MASEY.

DR. ZERFFI AND THE HISTORICAL DEVELOPMENT OF ART.

SIR,—Your readers ought to be much obliged to your correspondent "P. E. M." for exposing the Dr.'s blunders. His first care, however, ought to be to avoid falling into such himself. To begin with "the first false statement" that "the Jews were forbidden by law to carve or engrave." "This," says "P. E. M.," "no doubt refers to what Protestants term the second commandment of the Decalogue," and he quotes Josephus to prove that Solomon had on the steps to his throne figures of lions, but he does not say that Josephus condemns these identical figures of lions as being contrary to the Jewish law. In the 7th chapter of Book VIII of his "Antiquities of the Jews," and in the middle of the 5th paragraph, he says, "nay, before this happened" (he is speaking of Solomon's idolatry) "he sinned and fell into an error about the observation of the laws, when he made the images of brazen oxen that supported the brazen sea, and the images of lions about his own throne, for these he made although it was not agreeable to piety so to do." In a foot note to this passage, the translator, Wm. Whiston, A.M. says, "The Pharisees and latter Rabbins have extended the second commandment to forbid the very making of any image, *though without any intention to have it worshipped.*" Let me now state the case. Dr. Zerffi said, "The Jews were forbidden by law to carve or engrave." "P. E. M." says, "This, no doubt, refers to what Protestants term the second commandment of the Decalogue," and from his own false construction of an historical fact he infers that "as a moral commandment it would be equally obligatory on Christians as on Jews that illustrated periodicals" (even THE BUILDING NEWS) "must be sacrificed as opposed to the Divine will," and that "civilisation must come to a standstill or we should all be in danger of perdition!" It is in the same paragraph as this ingenious *reductio ad absurdum* that your correspondent speaks of "there being at the present time so much lecturing on art by persons not practicaly familiar with it. It is the blind leading the blind." If "P. E. M." is "practically familiar with art," I should recommend him to confine himself to its practice.

"P. E. M." seems to have made diligent search for evidence, of Jewish art, and finds from Josephus that their walls "might be counted amongst the strongest," and from the Bible that their houses "were, in the time of David, of two stories in height." To this it might be objected that a stone wall does not necessarily belong to the fine arts, and if a two story house is to be considered high art, what is your correspondent's opinion of the tower of Babel?

We are next informed that "Hiram, the great master mind, in the erection of the temple, the *ἀρχὸς τέκτων*" (I take the liberty of correcting "P E. M.'s" Greek) "or chief worker" was a Jew. If "P. E. M." will refer to 1 Kings vii. 14, and to 2 Chronicles ii. 14, he will find it distinctly stated in both passages that while his mother was a Jewess, his father was "a man of Tyre." In the first-named passage we find that "Solomon sent and fetched Hiram out of Tyre," and in the second, Huram, king of Tyre, describes him in writing to Solomon, as "a cunning man, endued with understanding *of Huram my father's*," and proceeds to detail his parentage and attainments at great length.

"P. E. M." takes considerable pains to inform us that the Jews "were employed on the Temple work," that "they brought great stones, costly stones, and hewed stones, to lay the foundation," &c. I have already objected to classifying stone walls among the fine arts, and am not aware that foundations have any superior claims to the title. I am willing to admit, however, that "*Solomon's builders*" were as much entitled to the names of painters, sculptors and architects as many persons of our own time who are, like them, "engaged in the service of the art triad."

When Dr. Zerffi stated that the Jewish nation was without painters, it is only reasonable to apply his remark to the Jews as a nation. When they were scattered abroad over the whole world, it would have been strange indeed if they had not adopted the manners and occupations of the people among whom they were placed. It is almost needless to remark that the individuality of the Jews is by degrees melting away, and that they are becoming assimilated more and more every day with the surrounding nations, and as this process is continued, it is natural to suppose that their national characteristics will gradually become blended with those of their neighbours.

"P. E. M." favours us with a few of his notions as to the causes of Greek art. "There was a constant demand," he says, "for figures of the gods." This is equally true of idolators over the whole world, but few of whom have emerged from barbarity. "Abundance of material" he says next, but this, as he said himself of its sea boundary, "is the same now as then." The Jews had also the advantage of public games (see Josephus' Antiquities, xv. 8, 1; xvi., 5, 3; xix. 1, 4, &c.) Greek art, he says, owes its excellence to "their style of dress." It does not seem to have occurred to him that "their style of dress owed its excellence to Greek art." But if these and fifty other causes were admitted to have influenced Greek art, Dr. Zerffi's argument would remain exactly where it was.

"P. E. M." again labours to prove that the Doric order is not characterised by simplicity. He would write to much greater effect if he proved the same of himself. The quotation which he is kind enough to supply from Fergusson exactly suits my purpose. That distinguished author says: "The Doric must not be regarded as a merely masonic form," thereby cautioning his readers against mistaking the studied simplicity of a Doric column for mere masonry.

The last of Dr. Zerffi's remarks that "P.E.M." thinks fit to attack is that "neither science nor art can flourish under a despotic priesthood," to which he opposes the counter proposition that "as faith dies out, or mental enlightenment weakens the priestly authority, the art creative power languishes and dies." Art creative power, that is, is, in an inverted ratio, mental enlightenment. The National Education Bill is striking a death blow at British art. Let us blow up our universities and go back with your correspondent to a state of blessed savagery. My eye is attracted to the concluding words of a letter signed A. G. Ellis on the opposite page from that of "P. E. M." May I trouble your compositors to put them in type a second time? "Are there not tribes still in their Stone Age, who help us to form some idea of the original condition of our own ancestors?"

"P. E. M." concludes by wondering why Dr. Zerffi's lectures make "no reference to Rome and Western Europe." I have also observed that Hallam's "History of the Middle Ages" is not brought down to modern times.

I regret exceedingly that time and space forbid my answering the letter of your other correspondent "G." This I shall be happy to do next week.—I am, Sir, &c.,

THE WRITER OF THE REPORT.

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

SIR,—At a special meeting on the 14th inst., the royal gold medal of the Royal Institute of British Artichokes ('mongst irreverent jokers called "destitute chokers") was bestowed on the Council candidate without a dissentient voice. The principal reasons assigned were that the individual was such an "old member" and was so "respectable." One of his supporters put the case in rather a backhanded way that "his friend was not only an architect but a gentleman!" The argument was striking and unanswerable, and mediocrity, true to itself, returned its "respectable" representative unanimously. Those who, as possessing some independence of mind and action, were expected to make fight were all conspicuous by their absence. It may be they thought their own claims would be canvassed, but if so they were miserably disappointed, no rivalry was attempted. I do not dispute, Sir, the worthiness of the recipient on the grounds adduced, but it is strange that these extraordinary (though obvious) grounds of merit are not mentioned in the Royal *rôle* of rules and reasons. In the same cool perfunctory, manner the other prizes were allotted, the meeting, however, rousing itself to a frenzy when considering on the bestowal of a few pounds sterling. The spending a pound of the Institute money is, to a well-known dear old Professor like drawing his heart's blood, and he seems to protest on behalf of the destitute Institute:—

"Who steals my name steals trash.
But he that filches my hard savings
Robs me of that which scarce enriches him,
And makes me poor indeed."

Y. Z.

SWINE CHURCH.

SIR,—Having heard that the above church is to be restored under the direction of a young and totally inexperienced architect of the neighbourhood, I trust you will, by making this known through your widely-circulated journal, call the attention of the ecclesiological societies of the district to the matter, and if possible prevent irreparable damage being done. The church is of early date, and contains many fine monuments. It is situated in the East Riding, about 6 miles from Hull on the Hull and Hornsea Railway.

Why should not the committee appoint a consulting architect of eminence to supervise the drawings? This might be done without in any way hurting the feelings of the architect appointed, and prove a shield to him in the event of adverse criticism.

It is lamentable to think that the work of our pious forefathers may be obliterated and ruined in incompetent and irreverent hands, through the ignorance of the lawful custodians of the venerable fabrics which are the glory of our land. Trusting that it may not be too late to stop the threatened devastation, I am, Sir, &c.,

A. L. W.

Croydon, March 15.

Intercommunication.

QUESTIONS.

[1803.]—SCULPTOR'S POINTING MACHINE.—Could you or any of your correspondents tell me where I could get a sculptor's pointing machine with any recent improvements which may have been made, or give me a description of such improvements so that I can get one made from them, as I am in want of a first class article?—JOSEPH HALL.

[1804.]—FINITE DIFFERENCES.—Can any correspondent inform me what is meant by finite differences? Does it mean differential calculus, and can any one recommend a good book on the subject?—PIC.

[1805.]—PLUMBERS' WORK, &c.—1. Will any of your practical readers kindly inform me of the use of a service box, and the means of fixing it (if one be required) to a slate cistern? 2. What is the width of lead used in the best work for covering the rolls in lead flats—the width of upper and under roll to be separately given? 3. In what situations is it desirable to use close copper nailing? 4. What are soldered dots; under what circumstances should they be used, and at what distance should they be placed? 5. How are the joints in the linings of lead cisterns effected, and is it necessary to have one at every angle? 6. What is the best bed for stonework in spires—horizontal or square with the rake, plain or rebated, and should the joints be dowelled or joggled? Answers to these questions will oblige—ZOFF.

[1806.]—PRESERVATION OF RED FACING BRICKS.—In the summer of 1868 I built a church, and faced the walls with black, white, and red bricks, laid in mortar, afterwards the joints were opened and pointed with Portland cement. In frosty weather the red bricks facing the south and west get a white hard surface; in rainy weather they return to their original red colour. I would like to know from some obliging reader why they change colour, and also how to preserve other red facing bricks that I laid in the summer of 1869, some of which have crumbled away with the winter's frost?—F. N.

[1807.]—MOULDINGS.—I am anxious to know the simplest and quickest method of obtaining full size sections of mouldings from old buildings. I have been advised to lead them, but do not fully understand the process. Perhaps some more experienced reader will enlighten me, or tell me some better way.—A. F.

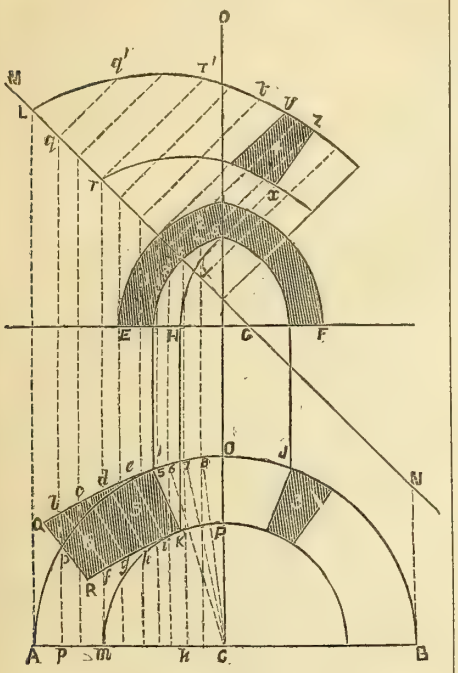
[1808.]—LEGAL.—Can any of your numerous correspondents inform me whether I can be compelled by law to pay for breaking a British plate glass window in a country village, the shop front being within 15ft. of centre of road, when the local board compels anyone to build not less than 15ft. from centre of road? It was done with a wagon, purely accidentally, and the insurance company claims the whole amount.—CARRIER.

[1809.]—BLACK SPOTS IN GRANITE.—Can Scotch grey polished granite pilasters in lengths from 10 to 5ft. and 18in. to 2ft. in width, be supplied without a black spot in any of them (about the size of a large walnut), or is it usual and natural for such a spot to appear in any of them?—IGNORAMUS.

REPLIES.

[1779.]—ARCH UPON CIRCLE.—Having set out the plan of circular wall, A I J B, *m* P *n*, from the centre C draw C D perpendicular to the diameter A B. Draw E F parallel to A B at any convenient distance from the wall lines. Set out I J at equal distances from point O on line C D for the opening of arch, and from those points I and J draw lines radiating to centre C, which will give the face lines of jambs. From the points I and J again draw lines parallel to C D, and where they intersect the lines E F set up the elevation of arch. I have divided each side of the arch into two stones by the radiating joint line drawn from the centre G and extended to M, and to enable a mason to work the four stones that form the arch, it will be necessary to make six moulds. Those numbered 1 and 2 will be the face moulds; that marked 3 will be the mould for beds that set on the top of jambs. No. 4 will be the heading joint mould for both stones where they meet on radiating line G M, and 5 and 6 are the two moulds for the development of soffit of arch. They will need dividing after the development is drawn, at the line *c g*, which coincides with the joint line of elevation G M. To get mould No. 3, it is only necessary to draw the radiating line C J. Nos. 1 and 2 are got by the construction of the elevation of arch, the flattened elevation of which would have to be got out if the arch were a large one, and not by perpendiculars from I and J as in the diagram. To find No. 4 draw parallel to C D (taking care that one of them intersects the intrados of arch at the point marked 3) any number of lines between A and C to meet the line G M. From the points of intersection draw other lines perpendicular to G M, and transfer the ordinates *p p*, *m m*, &c., to *q q'*, *r r*, &c., and through the points *q' r' t v z*, &c., draw a curve. The same way of transferring the ordinates from the inside of circular wall will find the inside curve on the section G M. On account of the jambs radiating to the centre from which the wall has been struck, the arch will be narrower on the inside of the wall than on the outside, consequently the line K H must be drawn parallel to

C D to meet the line E F, and from that point the curve of inside arch should be found by ordinates. From the point where this internal curve cuts the joint line G M draw the line X x perpendicular to G M, transfer the ordinate K k to it and join x z; the line x z will then be the soffit line of that mould, and v z the outside wall line. The section of the



joint in the centre of the arch will have the soffit line at right angles (or as masons term it, square) with the perpendicular face of wall. To get the development of soffit, which makes up the moulds 5 and 6, take the lengths of the spaces 1, 2, 3, 4, 5 in elevation, and set them off on a line drawn from the point I at right angles to the face of jamb K I, then from the points 1, 2, 3, 4, draw lines parallel to C D, meeting the external face of wall in the points 5, 6, 7, 8; draw lines from those points to the centre C. If lines be drawn from where these radiating lines cut the inside line of wall, parallel to C D, they will give the points on the internal curve of arch that correspond with the points 1, 2, 3, 4 on the external curve. Set those points, thus found, off, from internal curve, on a line drawn from the point K at right angles to the face of jamb I K, and then join the points b f, c g, d h, e i. From the points I, 5, 6, 7, 8, and 0, draw lines at right angles to K I, and also from the corresponding points on inside line of wall, meeting the lines Q R, $b f$, $c g$, $d h$, $e i$ in the points Q b c d e R f g h i; through the points Q b c d e I and R f g h i K draw curve lines, and Q I K R will then be the development of the soffit, and when divided through the line c g, No. 5 will be the soffit mould for the stone No. 1 in elevation and No. 6 will be the soffit mould for elevation No. 2. A large arch will require a greater number of stones as voussoirs, and consequently a greater number of moulds. Each joint that comes between the top of jamb and the centre of the arch will require a different mould, and each of them should be found by the same method as that of No. 4. The mould No. 4 might be found with a much less number of ordinates than is shown on diagram, all the ordinates needed being those that take in the depth of arch stones.—This rule will apply to a semicircular arch on the circle as well as a Gothic arch, and will be a reply to question 1799 in last week's issue. If "Rochdale" will take notice of my remarks last week on "Draughtsman's" diagram, he will see that the same will apply to his, for in stepping it with compasses he will find that there is a greater distance between A and C than there is between D and C Fig. 1 of his illustration. The difference, though, would not be of much consequence in the working of a small arch. An arch of from 2ft. to 2ft. 6in. opening in a circular wall struck with a 9ft. radius might be worked so that it would come nicely together when the lines are drawn, as in the accompanying diagram, perpendicular from the points I and J.—W. J. P., Tenby.

[1783.]—SHOP STOVE.—"Inquirer" must be a very green chip indeed if he is not cognisant of the concomitants of the time-honoured glue heating apparatus; sawdust or shop dust to a joiner would necessarily be the least expensive combustible and chips (dry) with a modicum of "nettle creepers" would effectually heat any species of glue without scorching, at an insignificant expenditure of either time or its monetary equivalent.—F.

[1800.]—MOUNTSORREL GRANITE.—In reply, to this query allow me to say, that the Mount Sorrel granite quarries are situated within one mile of the Barrow station on the Midland Railway, with which they are connected by a private line. The quarries have been worked for 80 or 90 years, and have, during the last quarter of a century, supplied London as well as a large number of the Midland, Northern, and Eastern towns, with the best "paving setts," besides sending away upwards of 50,000 tons a year of macadamising and other material for repair of roads. The Mountsorrel quarry is the largest granite quarry in the United Kingdom, and its size will be best understood by my saying that close upon 600 men and boys are employed on the works.—C. H. B. Hambly, Manager.

[1801.]—VELOCITY OF WATER.—The velocity of water issuing from a pipe is that of a heavy body falling through space, reduced by the retarded motion of friction. What the actual retardation of that friction is can only be determined by experiment. Many experiments have been made on that subject; perhaps those most worthy to be relied upon are those published in Eytelwein's "Handbuch und der Hydraulik," 1801, by which it appears that, if we call the velocity in feet per second v, the diameter of the pipe in feet d, the head of water in feet h,

$$v = 50\sqrt{\frac{d\,h}{l + 50d}}$$

l being the length of the pipe in feet. In the case given the velocity would accordingly be 16in. per second.—Waterworks.

STAINED GLASS.

The Martyrs' Memorial in Smithfield.—On Friday afternoon the Earl of Shaftesbury unveiled the Martyrs' Memorial in Smithfield. The memorial occupies one of the arched recesses in the wall of S. Bartholomew's Hospital, and consists principally of red and grey polished granite, the more ornamental part being in bronze. The style is Classic, to harmonise with the building. The head of the memorial is semi-circular in form, with a large bronze shell in the centre, set off with mouldings, between which is the text—"Blessed are the dead which die in the Lord." The cornice also consists of mouldings, and bears the text—"The noble army of martyrs praise Thee." This is supported by pilasters, between which there is a panel with the following inscription: "Within a few feet of this spot John Rogers, John Bradford, John Philpot, and other servants of God, suffered death by fire for the faith of Christ in the years 1555, 1556, and 1557." On the base is the further inscription: "Near this place is erected a church to the memory of the said martyrs." The whole is protected by a massive wrought iron grille. The memorial was designed by Messrs. Habershon and Pite, and executed by Messrs. Cox and Son, of Southampton-street, at their Lambeth granite polishing works.

WATER SUPPLY AND SANITARY MATTERS.

The Whitechapel Lodging Houses.—Dr. Liddle, medical officer of health, says that the police inspection of the lodging houses in his district is carried out judiciously and effectually on the whole. He states, however, that there is a great deal of overcrowding, for which the surveyor who measures the rooms is responsible, 250 cubic feet being almost the maximum space allowed per head in even the most airy of these cheap abodes for the poor. Mr. Liddle states that these lodging houses are by no means so healthy as is often supposed—an opinion which is borne out by the fact that 66 out of every 113 cases of relapsing fever were sent from the registered common lodging houses.

LAND AND BUILDING SOCIETY.

London Scottish Permanent Building and Investment Society.—The directors, in their last report, state that during the past quarter the number of shares held by members had doubled, and the society is now in a position to receive applications for advances.

Our Office Table.

The Royal Statues at Westminster.—The effect of gilding all the decorative statues of sovereigns in the Royal Gallery at Westminster, a costly work, which has been executed within the past few months, is, says the *Athenæum*, so far satisfactory that the brilliant white of the marble figures no longer interferes with the colouring of Mr. Maclise's pictures on the walls, and is splendid where all is superlatively gorgeous. At present, notwithstanding the use of gold somewhat dimmed in its brilliancy, the statues look rather hard and metallic; but—as few things of the sort approach old gilding in richness and sobriety of colour—if the persons in charge can be persuaded to let time take effect on the figures, the result will certainly be a glorious treat to lovers of colour in the coming generation. It is well worth while to see what a change gilding has made in Mr. Thornycroft's figure of Charles the First.

Society for the Encouragement of the Fine Arts.—The second *conversazione* of this society for the present season was held at the rooms in Conduit-street, on Thursday week, and was very fully attended. In addition to the musical programme, there was a short address by Mr. S. Solly, F.R.S., Vice-President, on the collection of pictures by the late James Holland, kindly lent for exhibition by Mr. C. C. Fuller. These works, which would be more properly described as drawings or sketches, covered all the walls of the anteroom, and were scrutinised with great interest by the visitors. The artist, as Mr. Solly took occasion to remark, began his career as a painter of pottery, and his first pictures, apart from the decoration of manufactured forms, were flower paintings. He afterwards rose to great distinction as a landscape painter, and among the countless limners of Venetian scenes he will always maintain a high reputation.

The British Museum.—On Tuesday evening a meeting of the inhabitants of the East of London was held in the Town Hall, Shoreditch, for the purpose of adopting resolutions favourable to the opening of the British Museum on certain evenings during the week. Mr. John Holms, M.P., who occupied the chair, in opening the proceedings, said the object of the meeting was to aid the motion of Mr. Allen, which would be proposed next week, should the state of public business permit, that the British Museum be opened to the public three nights in each week, and that a better use might be made of the national institution of the metropolis. They would not be asking too much were they to insist on the British Museum being opened five days in the week, and especially on the Saturday evening. He could not see why an institution of national importance, which cost annually £113,000 for its maintenance, should not be thrown open to the public. As a proof of the interest which they evinced in visiting the institution, it was found that the attendance on Monday was always larger than on any other day, and Easter and Whit Monday brought crowds of visitors. It was stated before the Commission by one of the superintendents that working men formed interesting collections of natural history for themselves, and within a range of a few miles of the Museum there were between 200 and 300 private collections. They might hope to see before long a higher technical education for the people, which would make them take a deeper interest in Museums were they thrown open to them. They had a great advantage over the other countries of the Continent, and that was in having shortened the hours of labour; but it would be well that the working men should utilise these hours.

Cemetery Buildings, Wooton Bassett.—In the recent competition for the cemetery buildings at Wootton-Bassett, the burial board selected the design sent in by Mr. Thos. S. Lansdown, architect, of Swindon, and has instructed him to proceed with the carrying out the same. The designs are 14th century Gothic, and consist of two chapels, each 30ft. × 18ft. internal dimensions having opened timbered roofs springing from stone corbels. There is a bold entrance to each of the chapels, surmounted by a bell turret. The curator's house will be placed near the entrance, and will consist of parlour, kitchen, board-room, and offices, and also three good bed-rooms. We hear Mr. Lansdown is also entrusted with the laying out of the grounds, fences, entrances, &c.

Tall Chimneys.—A wrought-iron chimney, 196ft. high and 6ft. 7in. in diameter, has just been erected in Pittsburg. Another is to be put up 275ft. high. The first was riveted together in a horizontal position, and then lifted to the perpendicular by a crane. The other will be made upright; the plates will be riveted by means of a scaffolding running up inside.

Bradford Art Society.—A Bradford contemporary has drawn attention to the formation of a society under the above title, which has been organised, and holds meetings regularly, in the room of the Chamber of Commerce, Bradford Exchange. The objects the society has in view are to bring local artists into closer companionship with each other, of discussing matters pertaining to art, and to promote an autumnal exhibition of the art talent of the town and neighbourhood. The society consists of ordinary members, who will be expected to contribute of their own work to an exhibition in August next, and to the annual displays of local art produce, of which it is hoped the August exhibition will be a long series; of honorary members, who will be permitted but not bound to exhibit; and of lady members, who will enjoy the privilege of honorary members at half the moderate fee stipulated from the latter. The leading artists of Bradford are stated to have attached themselves to the society, and an amateur talent has been disclosed such as few persons knew to exist in the teeming and toiling population of Bradford. The large and varied field of works eligible for exhibition include "oil paintings and water-colour drawings, sculpture, architectural and other designs, engravings, drawings in crayons, sketches in oil and water-colours, vignettes, pen-and-ink sketches, and finished pencil drawings." It is also proposed to have lectures by the members on the principles of art. A society of the nature indicated is much wanted in Bradford, and the promoters will no doubt receive that earnest and hearty amount of support in the important work they have undertaken to which they are entitled in their efforts to elevate the taste of the community, and to encourage the earnest study of the fine arts in a practical direction.

Chips.

The system of permanent way known as "Knowles's permanent way" is about to be tested for a short length upon one of the railways near London.

The Bournemouth and Christchurch section of the Ringwood, Christchurch, and Bournemouth Railway, has been opened for passenger and parcel traffic.

The Academie des Beaux Arts has elected Herr Dracke, Prussian sculptor, as a foreign associate to its body, in the place of Tenerani.

MEETINGS FOR THE ENSUING WEEK.

MONDAY.—Entomological Society. 7.
" Institution of Surveyors. Adjourned discussion on Mr. Squarey's paper on "Farming Covenants,' after which Mr. Matthews will read a paper entitled, "A Plea for Culture in the Profession of a Surveyor. 8.

TUESDAY.—Institution of Civil Engineers. Continued discussion on Mr. Fox's paper "on the San Paulo Railway. 2nd. "On the Conditions and Limits which Govern the Proportions of Rotary Fans." By Mr. R. Briggs. 8.
" Royal Institution. "Deductions from the Comparative Anatomy of the Nervous System." By Professor Rolleston, M.D., F.R.S. 3.

WEDNESDAY.—Society of Arts. Adjourned discussion on Mr. W. Bridges Adams paper on "Tramways for Streets." 8.
" Geological Society. 8.

THURSDAY.—Society of Antiquaries. 8.30.
" Society for the Encouragement of the Fine Arts. Lecture by J. Dafforne, Esq., "On the Poetry of the Arts." 8.
" Royal Institution. "On the Chemistry of Vegetable Products." By Professor Odling, F.R.S. 3.

FRIDAY.—Architectural Association. Recent Improvements in Building Appliances. By Mr. J. Douglass Mathews, A.R.I.B.A. 7.30.
" Royal Institution. "On the Histories of the Fourth, Fifth, and Sixth Centuries in England, as Illustrated by the Modes of Sepulture then Practised." By Professor Rolleston, M.D., F.R.S. 9.

SATURDAY.—Royal Institution. "On the Sun." By Norman Lockyer, Esq., F.R.S. 3.

Trade News.

WAGES MOVEMENT.

GLASGOW—JOINERS' STRIKE.—At a crowded meeting of joiners, held on Wednesday, encouraging reports were submitted with regard to the amount of assistance the operatives were receiving from different trades in Glasgow and other places, and it was resolved that a dividend should be paid to the non-society men out on strike. Deputations were appointed to meet with the members of various trades in Greenock and Dumbarton, and also to meet with the masons, plasterers, and bricklayers of Glasgow, to solicit aid. The men pledged themselves to adhere to their present demands, at least till Tuesday next. The printed monthly report of the Associated Carpenters and Joiners of Scotland says:—"As was fully anticipated in last return, the joiners of Glasgow ceased work on Tuesday, 1st March. About 1500 cleared out of the shops on the Monday night, and since that time the numbers have been gradually reduced, till at the present time there are not 1000 on strike. This reduction has not been caused by any wavering or secession in the ranks of the men on strike Scarcely any of those who came out have resumed work on the ten hours' system, and by latest accounts the men are more firm than on the day they came out."

TENDERS.

APSLEY END.—For S. Mary's Church, Apsley End, Herts, for Charles Longman, Esq. Mr. Joseph Clarke, F.S.A., architect:—

Roberts	£5350
Bell and Sons	4730

BERKS.—For pulling down and rebuilding part of Broomfield Hall, Sunningdale, Berks, for Thomas Holloway, Esq. John Dale, Esq., architect:—

Nutt and Co. (accepted)	£9136

BISHOP'S STORTFORD.—For S. Michael's Church, Bishop's Stortford. Mr. Joseph Clarke, F.S.A., Diocesan architect:—

(Tender for First Portion of Works carried out.)

Tooley	£3231 13 6

(For new north aisle to chancel, without seating and rebuilding vestry.)

Tooley	£1380
Bracher and Sons	1300
Roberts	1195
Gibbons	1097
Mason and Green	1089
Glasscock	1025
Cooke	948
Bell and Sons	927

CITY.—For building warehouse, Wood-street, Cheapside, for M. Da Costa Andrade, Esq. Mr. H. H. Collins, architect. Quantities supplied by Messrs. Batstone and Hunt:—

Myers and Sons	£1936 0
Cohen	1807 10
Moultrie	1743 0
Henshaw	1739 0
Ebbs and Sons	1606 0
Merritt and Ashby	1541 0
Newmann and Mann (accepted)	1515 0

CROYDON.—For re-seating Holy Trinity Church, Croydon. Mr. Joseph Clarke, F.S.A., architect:—

Day	£376
Shepherd	327
Knight and Son (accepted)	325
Pollard	283

DULWICH.—For the erection of the coach-house and stabling at Westwood House, East Dulwich. Mr. J. H. Rowley, architect:—

Snowdon	£345
Crabb and Vaughan	312
Dewell	306
Lennard	298
Shepherd	185
Mundy (accepted)	165

FOLKESTONE.—Nor building new north aisle, sacristy, and porch, and enlarging sanctuary of the Church of S. Peter, at Folkestone, and raising the present roof an extra height of 5ft. Mr. Spencer Slingsby Stallwood, architect, Folkestone:

	With porch and credit old materials.	Without porch.
*Brooks and Slade	£1680 0 0	£ ———
Baker	1388 1 9	1240 9 11
Adcock	1237 3 10	1124 6 8
Prebble	1220 0 0	1107 0 0
Bowley	1127 0 0	1029 0 0

* In this case estimates were not divided as called for.

FULWOOD.—For the erection of a county police station at Fulwood. Messrs. Myres, Veevers, and Myres, architects and surveyors. Quantities supplied:—

Jackson	£1073 0 0
Saul	1037 0 0
Alston	996 0 0
Christian	973 0 0
Cooper and Tullis	939 14 3
Tomlinson	905 0 0
Turner (accepted)	849 0 0
Clayton	880 0 0

GRANTHAM.—For pair of semi-detached villa residences in the Avenue-road for Mr. Payne. Architect, Mr. Bentley:—

Rudd and Son	£629
Challans	615
Priest and Snaith	585

HOLBORN.—For female infirm wards at S. Luke's Workhouse, for the Guardians of the Holborn Union, Mr. H. Saxon Snell, architect. Quantities supplied:—

Wilson	£12,250
Myers and Sons	11,888
Cowland	11 770
Colls and Sons	11,733
Perry and Co.	11,559
Perry, Bros.	11,447
Hill, Keddell, and Waldram	11,382
Hart	11,250
Ebbs and Sons	11,146
Manley and Rogers	10,817
Bull and Sons	10,799
Lathey, Bros.	10,430
Crabbe and Vaughan (accepted)	10,085

HOLBORN.—Hydraulic lift and sanitary fittings at the female infirm wards at S. Luke's Workhouse. Mr. H. Saxon Snell, architect. Quantities supplied:—

Potter and Sons	£1398
Benham and Sons	1385
Jeakes and Co.	1278
Turner and Co. (accepted)	1214

ISLINGTON.—For first portion of fittings for casual wards, Islington workhouse. R. H. Burden, Esq., architect:—

Nutt and Co. (accepted)	£300

PINNER.—For erection of dwelling-house and offices at Pinner, for F. W. Goodall, Esq., R.A. R. Norman Shaw, Esq., architect. Quantities by Messrs. Franklin and Andrews:—

Little	£5979
Patman and Co.	5685
Humphrey	5475
Trollope	5438
Carr and Son	5270
Simpson	5163
Browne and Robinson	5145
Rider	5080
Birch	4987
Newman and Mann	4986
Cowland	4887
Jackson and Shaw	4595

PRESTON.—For the erection of chapel of ease to S. Paul's Church. Messrs. Myres, Veevers, and Myres, architects and surveyors:—

Alston	£1176 0 0
Cooper and Tullis (accepted)	1076 6 11
Dewhurst (plumbing)	36 0 0

RICHMOND.—For alterations to stable buildings at Bute House, Petersham, near Richmond. Mr. W. Scott Champion, architect:—

Bridgman and Nuthall	£649
Nutt and Co.	680
Sweet and Son (accepted)	465

ROCHDALE.—For alterations to Dunster House, Rochdale, for Jonathan Nield, Esq. Mr. Joseph Clarke, F.S.A., architect:—

Seedell (accepted)	£1100

SANDWICH.—For S. Clement's Church, Sandwich, Kent. Contract for second portion of nave and aisles restoration. Mr. J. Clarke, F.S.A., Diocesan Architect:—

Wilson	£1072
Deane	993
Adcock	948
Shrubsole	947

SHENDISH PARK.—For footbridge over London and North Western Railway from Shendish Park, exclusive of ironwork. Mr. Joseph Clarke, F.S.A., architect:—

Roberts	£495
Bell and Sons	455
Dunkley (including iron girder)	511

WALTON-ON-THAMES.—For building new billiard room and kitchen, wing, &c., to Holwood House, Walton-on-Thames, for James Puzey, Esq. Mr. Charles Bell, architect. Quantities not supplied:—

Rankin	£525
Kennington (accepted)	411

WORTH.—For partial reseating of Worth church, Kent. Mr. Joseph Clarke, F.S.A., Diocesan architect:—

(Tender for the whole.)

W. and G. Denne	£230

(Masons' Work.)

Jones	£80
Newton	78

(Carpenters and Painters' Work.)

		Add masons' work	
Wyborn	£185 0	£78	£263 0
Ralfe	161 16		239 16
Mout	144 3		222 3

WHITSTABLE.—For new schools, Seasalter, Whitstable. Mr. Joseph Clarke, F.S.A., Diocesan Architect:—

Cornelius	£538
Porter	537
Harnett	520
Cephas Foad	502
Lawson, Jun.	495

COMPETITION.

MANCHESTER, May 30.—For abattoirs and a carcass market The following premiums will be awarded:—One of £150, one of £100, and one of £75. Joseph Heron, Town Clerk, Town Hall, Manchester.

CONTRACTS OPEN FOR BUILDING ESTIMATES.

ROTHERHITHE, March 21.—Christ Church Boys' National Schools.—For the erection of the above schools. T. C. Colley Hon. Sec., February, 1870.

ST. GILES, CAMBERWELL, March 28.—For sinking about ten wells, and supplying and fixing pumps to the same. George William Marsden, Vestry Clerk, Vestry-hall, Camberwell.

GREENWICH DISTRICT, March 23.—For laying down Aberdeen granite kerb and Aberdeen granite cubes for channels, and other materials and works required for making up the roads and footways of Bowater-place, Bowater-terrace, Russell-place, and Bedford-place, Old Dover-road, in the parish of Greenwich. E. W. James, Clerk to the Board, Greenwich.

THE TROUVILLE ASSOCIATION (Limited), March 21.—For the formation of certain roads, on the estate at Trouville-sur-Mer, Normandy. Architects, Messrs. Harvey and Nelson, 6, Whitehall, London.

SLIGO CORPORATION WATERWORKS, March 25.—Contract No. 1.—For the construction of the storage, reservoir, filter-bed, and pure water basin, relief tank, and service reservoir. Contract No. 2.—For providing various articles of cast and wrought ironwork required for the construction of the reservoirs and works connected therewith. James M'Kim, Town Clerk, Sligo, Town Office, Sligo.

NORWICH, March 23.—For the erection of a church in the parish of St. Philip, Heigham, Norwich, in three contracts, No. 1, No. 2, and No. 3. Edward Power, architect, 1, Walbrook-buildings, Walbrook, London.

KIRBY STEPHEN, March 28.—For the works required in the restoration of the parish church. Architects, Messrs. Austin and Johnson, Newcastle-upon-Tyne.

CROYDON LOCAL BOARD OF HEALTH, March 21.—For the erection of two patent solid sewage extractors. R. J. Chesswright, Clerk, Town-hall, Croydon.

GLOUCESTERSHIRE, March 21.—For the erection of a police station and petty sessional court, at Chipping Campden. Mr. J. Medland, County Surveyor, Clarence-street, Gloucester.

EDMONTON UNION, March 21.—For the erection of an infectious hospital at the Union Workhouse. Wm. Pulley, Clerk to the Guardians, Edmonton.

RICHMOND, YORK, March 23.—For the erection of a gasometer, and the requisite pipes and apparatus, to supply a gentleman's mansion-house and stables, &c., with gas. James D. Ferguson, land agent, Richmond, Yorkshire.

NORTHAMPTONSHIRE, April 11.—For the erection of farm buildings on the Fawsley Estate. Mr. Waters, Estate Office Fawsley, near Daventry.

HIGH WYCOMBE, March 25.—For the erection of a sixteen roomed detached residence and offices. Mr. Arthur Vernon architect, High Wycombe.

MARKET HARBOROUGH, March 31.—For building ale stores. John Ladds, architect, 4, Chapel-street, Bedford-row London, W.C.

FISHTOFT, near BOSTON, March 21.—For the works in the construction of a sea bank about 1½ mile in length, for enclosing the Milk House Marsh. W. H. Wheeler, C.E., Boston.

ADMIRALTY, March 29.—For supplying her Majesty's several dockyards with 500 loads of English elm timbers. Antonio Brady, Superintendent of Contracts, Contract Department, Admiralty, Whitehall, S.W.

WEST LONDON DISTRICT SCHOOL, March 25.—For the erection of school buildings to accommodate about 850 children at Ashford, Middlesex. Charles D. Hume, Clerk to the Managers.

BRIGHTON.—For the erection of six fourteen-roomed houses. Mr. Crawford, 54½, Bishopsgate-street Within, E.C..

BURSLEM.—For the erection of a residence at Port Hill Mr. T. B. Harley, Burslem.

THE BUILDING NEWS.

LONDON, FRIDAY, MARCH 25, 1870.

EXTERNAL FACINGS AND DRESSINGS.

ONE of the advantages of our present rapid means of locomotion is the facility it affords the observant architect of drawing sharp contrasts of the *triste* or the cheerful architecture of the towns and villages he flies past in the course of, it may be, a long railway journey. There is much to be learnt in the process. This special fact amongst others, that in smoky towns at least, something more than determining the main lines, and merely *formed* details of a building is necessary to its successful design and pleasing expression. Our traveller will come upon rural villages, some of them of brick, white, red and yellow; some of them of stone; some even of cob; but whatever their material, he will see that, as they lie basking in the sun, under a clear, smokeless sky, their aspect is nearly always pleasing. It matters little with what material their buildings are *faced*. If he do come upon an architectural eye-sore of any kind, the chances are it is the ambitious work of some thoughtless architect, whose violent skylines, coarse details, or, more frequently, in harmonious contrasting of coloured materials (conveyed, haply, from some exotic source), hail the traveller from out the unobtrusive village with their loud vulgarity. Such cases are but exceptions to prove the rule that, in country places, however amenable they may be to the blandishments of good architectural outline and proportion, an architect need seldom be over solicitous about what the painters would term the local colour of his buildings. Even compo, so often considered (and most erroneously considered) the fittest for town architecture, will pass muster; and look cheerful and respectable in the country. Interesting and beautiful it will never look anywhere. It is said to be a material that rather absorbs than reflects the light; it is ever monotonous, whether it be painted or coloured, or used *au naturel;* we should hesitate to call it, in the face of certain purists, truthful and virtuous—we simply aver that, in smokeless country places, it will, with every other material we can think of, pass muster.

But, as he passes through the smoky towns, our traveller will see that buildings of even good architectural proportion and skyline that would do more than pass muster—nay, look charming—in the country, buildings of what our friends the purists would call "honest" material, have a certain something about them which is displeasing, unsatisfactory, and might somehow have been better. It is not easy to say at once what it is they lack—perhaps the sun to break out and throw them into strong contrasts of light, shade, and shadow—we can't at once say; but anyhow we are dissatisfied with them, and glad to come upon the next country edifice of any consequence; or at least upon the buildings of some comparatively smokeless town, of which there are many in Old England.

Let the journeying architect analyse the cause of this. Let him enter one of the smoky towns, notably a manufacturing one; and he will be struck with the gloomy aspect of even ashlar stone buildings of unquestionably good architectural outline, proportion and detail; while that of compo-faced buildings is simply abominable. Should he, seeing all this in Leeds, in Manchester, in Birmingham, come to the conclusion it is all owing to their excessive smokiness, let him try the effect of a walk in the metropolis. Let him look at the S. Giles's Schools in Endell-street—that brick building of such admirable proportion and outline; or at those stone buildings, admirable for nothing, the British Museum, or the College of Physicians in Pall Mall; or again at those compo buildings in Victoria-street, Westminster, the town mansions, really of excellent proportion; and what will he see? He will see that the brick and the stone and the compo structures, albeit they are not quite so black and gloomy as the buildings in the large manufacturing towns, resemble them all in their *triste*, unsatisfactory aspect. The fault, if he reflects on it, will be found to lie in the want of contrast of local colour in the materials with which these buildings are faced. In street architecture, so unlike in its conditions to country architecture, this want of colour contrast is fatal to the success of any architectural work. For lack of it the gloomy stone buildings of Sir Robert Smirke look more intensely gloomy; Mr. Barry's clever Gothic school frowns dismally on its two cheerful neighbours opposite, by Mr. Pennethorne and Mr. George Pownall; and the stately town mansions in Victoria-street can never, despite their array of chintz, muslin and mignonette, have as cheerful an aspect as the façade of Messrs. Vickers' distillery on the very same side of the same street. Nor is the fact altogether owing to their being faced with compo instead of stone.

Stone is undeniably a very beautiful material; but, on the score of mere beauty, it is not always the best material with which to face every town building. Much will of course depend on the aspect of the façade, towards or away from the sun's rays. The same may be said of the exclusive use in a town façade of any material whatever. A building of architectural pretension, constructed wholly of brick, with brick strings, cornice and window dressings, will need a very expert designer to redeem it from unmitigated ugliness. On the other hand brick, of whatever colour, whether it be gray stock brick, as in the case of S. George's Cathedral at Southwark, or red brick, as in that of Lambeth Palace, when well relieved, as these buildings, are with stone dressings, has always a pleasing, cheerful appearance. Stone, from some cause or other, does not stand well in a London atmosphere: witness the sad failure of this material in the Houses of Parliament. It is so excessively costly in town that few private individuals can afford to use it in their buildings. The reign of compo facings is nearly over; and brick, not always of the best and most sightly kind, is now very generally employed, not only for wall facings but for dressings. We now see all about London and its suburbs buildings faced with the dull fawn-coloured brick of the locality, "relieved" with dressings of red brick, red brick quoins, corbels and cornices, stringcourses, sills, heads, and other window and door dressings. But whatever the colour of these dressings, the effect of them is nearly always coarse, and void of beauty or refinement. This coarseness is simply perceptible in Gothic work, but in attempts at Classic, Italian, or Renaissance mouldings, it is obtrusively offensive. Much better would it be for such brick buildings were these dressings executed even in Portland cement, if real stone cannot be forthcoming—not on the score of durability nor yet (save the mark!) on that of "honesty," but on the score of colour-contrast necessary to cheerfulness and beauty. Here it may be urged that, if brick projecting dressings must needs be used, it is always—and especially in Classic work—better to have them of a uniform monotone with the wall facing than variegated. The gray stock façades of the metropolitan police stations are coarse enough in all conscience, but what are they to street fronts and villas in and around London, faced with the like material, "relieved" with projections of red brick, or worse still, with cornices, pilasters, &c., of glaring red, white, and black brick? We require in town a veritable Building Act to abate these abominations, these offensively abortive efforts to create silk purses out of sows' ears. Parti-coloured brickwork as a general rule should be confined to bands or patterns, worked flush with the surface, or "naked" of the wall. They are usually failures where they go beyond this rule, whatever be the style of architecture; while projecting dressings, as corbellings, blocks, &c., are best confined to bed-mouldings, or other covered features, and vertical dressings should be sparingly used; in nine cases out of ten they obviously break the bond of the work, and are best avoided altogether. The remark refers to *constructive* dressings of the kind, not to *cast* ones, as seen in many ancient works; such as mansions in Norfolk, Essex, and elsewhere. Cast brickwork, indeed, is a very appropriate material for town buildings, as might a short time ago have been seen in and about Queen-square, Westminster; and may still be seen in Old-square, Lincoln's-inn. For town use, even flush brick patterns in a wall are hardly worth the trouble of devising and working. Recessed brick bands, as of brick set arris-wise, are manifestly smoke-proof, and will endure as long as the brick walls they are set in; but who will predicate as much for Mr. Butterfield's black ones set in the red brickwork of All Saints, Margaret-street, or, more ephemeral than they, the red ones set in gray stock brickwork all over the metropolis? Black brick bands in stocks, as used by Mr. Clutton for his convent near Victoria-street, and glazed black diapers in red brick, as used at old Lambeth Palace, will, for aught we know, abide the advent of Macaulay's New Zealander.

It would seem then that, if the Londoners are to continue building, or rather facing their buildings with gray stocks, they will do well to eschew all intermixture of that material with red brick, whether applied to compositions in either the "streaky bacon" or the "blear-eyed" styles of architecture. If they would, as they needs must, relieve this dull-looking material at all, it will be best done by stocks themselves, set back arris-wise or otherwise within the wall; or by black (not red) bands and diapers, built flush within it. It is a material which can hardly dispense with architectural dressings; and these should be of "honest" stone, as in Messrs. Robarts' bank, Lombard-street. Should the architect be driven to the use of its compo substitute, he may console himself with the reflection that a stringcourse or cornice of compo is quite as "honest" as a simulated arrangement of coarse bricks with gaping mortar to serve for a cornice of mouldings, which it can only caricature.

For all smoky towns, it is greatly to be regretted that red bricks cannot be more generally used for wall facings, not exclusively used, but relieved with stone, or any lighter coloured substance, as in Marlborough House, Pall Mall, or in the buildings opposite the east end of the Royal Exchange. These structures always retain a cheerful appearance, their cheerful aspect being evidently the result of the intermixture or relief of materials; as any one may perceive who will contrast them with other red brick buildings, in whose composition there is no such relief, such as, for example, S. James's parsonage, Piccadilly. Red brick is indeed the comeliest of all bricks, but then it should be used for the body of the wall, not be sparsely applied as an ornament, set-off, or relief to walling of another colour; at all events, in town fronts, and for projecting dressings to such walling, we can conceive nothing more hideous. As to the colour of the red brick, it will always be best to procure for town purposes a light or salmon-coloured brick. Every one who has compared the light, cheerful-looking material at Marlborough House with the sombre-looking walling of All Saints' Church, will perceive the truth of the remark.

These observations on brickwork have been chiefly restricted to its use in the metropolis, where we have such a variety of bricks in the market—a variety so great, that even architects are often puzzled to enumerate them—

and yet none of them can be said to be suitable for facings of town buildings, by reason of their dull colour. But in the provincial towns the architect finds a surprising difference in the supply and choice of this useful material. Thus Liverpool possesses but one description of brick, and that one of a dull brown red. There all attempts at variegated brickwork, of which London has just now such a plethora, are out of the question. We only know of one such building in the whole town. In Cheshire, and in other parts of Lancashire, there are at least three several kinds of coloured brick, and these are used for facing purposes in five different ways, producing just as many tones of colour. Three of these arise simply from the natural colour of the best, second best, and common brick of the locality, but two more varieties are obtained by the local mode of use, unknown or hardly known in the metropolis, and the effect of either of them is very pleasing.

One of these kinds of facing is locally termed "seconds and white ends," and consists in the facing of a wall in Flemish bond, with stretchers of (light red) "seconds" brick, and headers, burnt to a very pale red or flesh colour, of the common (red) brick. The process gives the wall a sparkling, chequered appearance, which, where it can be kept from the influence of smoke, gives a good effect, especially to large surfaces of walling, at a very moderate cost. It is a very old method of facing a wall, and is somewhat falling into disuse.

The other mode of facing is by "white ends" alone—that is to say, by constructing the front with burnt headers only, each superimposed course breaking joint in the usual way with that of the course beneath it. This method gives a warm mottled grey tone to the wall, and out in the country, as at Alderley Edge, in Cheshire, where the burnt ends have a pale pink colour, the effect is remarkably pleasing.

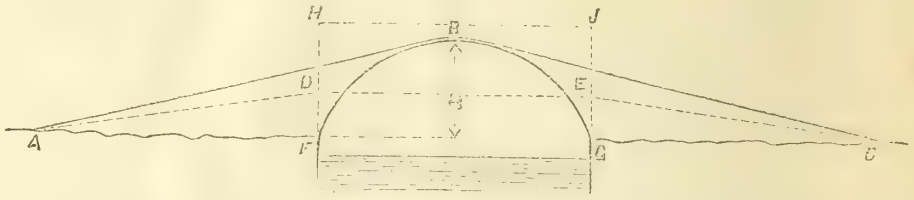
These two descriptions of facings are, however, wholly subject to the remark as to local colour with which this article opened—that is to say, they do well enough in the smokeless, rural districts; but, like London stocks relieved with red bands or interlacings, they are of but brief use in the smoky towns. This may be found at Bradford, near Manchester, where both the London and the Manchester modes may be seen—or, rather, might a few years ago have been seen—combined, in the case of a church, faced wholly with white headers, interlaced and banded with red bricks. In this case, the ingenious patterns of the architect have come to nought; they and the "white ends" having, in less than nine years, settled down to a monotonous dull grey, the sure fate of all such feeble alternations of colour in large smoky towns. The same thing may be seen in London, hardly so smoky a place as Manchester, by anyone who will examine the cleverly red-banded facings of Mr. Gray's building at the corner of Tavistock and Southampton-streets, Covent-garden. Had it been faced wholly with stone, it might, with Arthur's Club, or the Wellington, in St. James's-street, have been equally monotonous—a conclusion not wholly destitute of comfort when one reflects on the dangerously perishable nature of London masonry.

Bethinking us of the moral of our article, it would seem to lie in the conclusion that in smoky towns, where it is procurable, there is nothing so desirable for facings as bright red brick walling, relieved amply and judiciously with dressings of compact, bright-looking masonry; or (shall we confess it?) Portland cement when stone cannot be had.

ARCHED ROOFS.—No. I.

UNTIL reflection guides us to the reason why the abandonment of the arched form for bridges of large span should be followed by its introduction for roofs under similar circumstances, the fact appears almost paradoxical. The cause of the arch falling into disuse when the span of the structure becomes excessive is due to the great rise, or versed sine, necessary to afford the requisite degree of stability and equilibrium. It is true that the ratio between span and rise is reduced to the minimum limit when iron is the material used, but even that limit becomes impracticable under certain conditions. A reference to fig. 1, which represents the ordinary conditions relating to a bridge over a river, will show the necessity of deviating from the arched form in numerous instances.

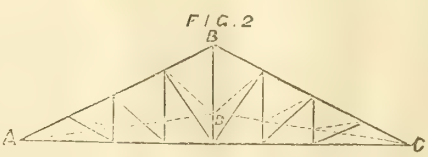
FIG. 1



Let F B G represent the general contour of an arch bridge over a river, having the minimum rise X that can be given to the span. Let A F G C represent the surface of the ground, which is naturally not much above that of the water-level, and suppose A and C to be the points the most remote from the centre B of the bridge at which it is possible to commence raising the roads. The inclination of the roads cannot therefore be less than that of the lines A B, B C. Suppose that by Act of Parliament, or in consequence of other conditions equally compulsory, the steepest gradient is fixed at that shown by the lines A D, E C. Since the crown of the arch cannot be flattened to that level, it is clearly necessary to abandon that form of construction and adopt another. The simplest method available is that shown by the dotted line, which consists in running the abutments up to D and E, and throwing a horizontal girder across. The girder itself may either be rectangular, as shown by the dotted parallelogram, or its upper member may be curved similarly to that of a bowstring girder. There are other circumstances in connection with this type of construction which have also had considerable influence in leading to the partial discarding of it by engineers, but the impossibility of adapting it to suit certain physical contingencies of ground and locality has been *prima facie* the reason of its being superseded by other more favourable forms.

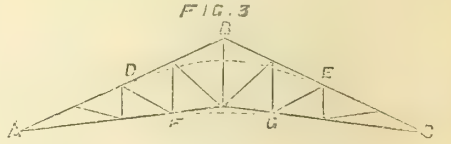
The introduction of the arched form to the construction of roofs was due principally to the necessity of dispensing as much as possible in railway stations with all intermediate supports from side wall to side wall. The enormous height also to which it was necessary to raise the rafters of the old trussed roof when the span became of large dimensions speedily rendered a modification of the system indispensable. Headway was likewise of paramount importance, which was pinched when the truss had a horizontal tie rod. We will just trace the several alterations and modifications which the old truss has undergone in order to render it suitable to modern requirements. In fig. 2, A B C represents the

FIG. 2



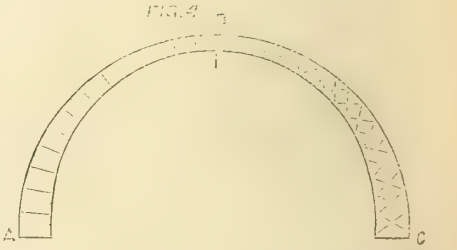
older system of truss, where the tie rod A C is horizontal, but as more headway was frequently required, its original shape was altered to that of A B C, the dotted lines A D, D C showing the new manner in which the tie rod was inclined and additional room obtained underneath. We are not at present concerned with the calculation of the strains upon a truss of this description, but it may be briefly mentioned that the effect of inclining the tie at an angle with the horizon is to increase the strains upon all the members. The strains upon the rafter are proportional to the angle between it and the tie. Those upon the other component parts are also dependent in some measure upon the angles they themselves make with the rafter. Thus it will be seen that additional headway in a roof is not gained without a corresponding disadvantage with regard to the amount of the strains generated throughout the truss. By the modification introduced in fig. 2, not only is the headway increased, but the depth of the truss is reduced, which is a concomitant cause of the increase in the strains. But when roofs of very large spans began to be constructed in iron, it was at once sought to still further reduce the depth of the truss, and this brings us to the first approximation to the curvilinear form. The diagram in fig. 3 shows the modified truss A B C, with

FIG. 3



the inclined tie rods. The dotted curved lines show the alterations that virtually transformed it into an arched roof. The exact contour, as well as the proper system of bracing, is not shown in the diagram, to avoid confusion, but merely enough to illustrate the introduction of the principle. There is still another form which will complete the series, and which is used to avoid the employment of any tie rod whatever. It is the type of construction erected at most of the underground stations, and one which we shall give an analysis of. The principal parts are an upper and lower flange, connected together by either a solid or an open web, as represented in fig. 4. The

FIG. 4



web in the roofs of the underground stations consists of a solid plate, stiffened at intervals by radiating tie or angle irons, but lattice bracing is also used for the web in some instances, notably in the gigantic structure, roofing in the station at S. Pancras, on the Midland line. So far as the merits of the solid or open web are concerned, there is not much superiority to be claimed by either. The latter is rather more economical, and certainly has a lighter and more elegant appearance, but does not give so much stiffness and rigidity as its rival. By bolting cast-iron bosses and ornaments to the intersections of the lattice bars, the monotonous aspect of the diagonal lines can be relieved, and the trellis arrangement broken up, as it were. Where the

span of the roof is small, it is immaterial, so far as regards economy of metal, which description of web is used. The conditions in either case give very little strain upon that part of the arch. It only requires to be thick enough to maintain the flanges at their proper distances apart, and so prevent their being subjected to any strains but those of a compressive character. The bowstring girder is sometimes used as a roof principal, and is an economical form where the span is of considerable dimensions. It has the disadvantage of possessing a horizontal tie, so that it is not well adapted for instances in which the headway must be a maximum. In all curved roofs of a segmental shape, it must be borne in mind that there is a discrepancy between the theoretical premises and the practical deductions. It is assumed that the curve of the upper flange of a bowstring girder, for example, does not differ sensibly from that of a parabola. All that remains to ensure in practice is that it should not, which is not effected by making the curve that of a parabola, but by so proportioning the ratio of the rise to the radius that the described circle shall not depart to any appreciable extent from that curve. Obviously there are practical difficulties, inseparable from workmanship, which would render it exceedingly unadvisable to adopt any other curve than that of a circle. Ordinary workmen can readily describe a circle of any radius, but the accurate laying off the ordinates and alscissæ of a parabola is a step beyond their capabilities. We must reserve for our next article the investigation of the action of the strains upon curved roofs, and the method of calculating them.

SALISBURY CATHEDRAL AND ITS ORGAN.

AMONG the very many questions now so much debated, and so loudly calling for solution, and perhaps a new idea to help it, there is not one more interesting and important than that of the future use to be made of our great cathedrals. What are they for—with all their great empty spaces, and how can they be adapted to present requirements; or can matters, as they are at present, be so altered as to adapt themselves to the cathedrals? These are, indeed, tremendous open questions, and very hard to answer; but one at least out of the many may be open to a comparatively easy solution, and it is this one, viz., that cathedrals are, of all other buildings, the very best for musical purposes, and especially for the purposes of sacred music. This fact stands happily apart from creeds and formalities and pedantries of all kinds; and it becomes therefore a matter of no small interest to inquire as to what kind of instrument, or instruments, is best fitted for them, and where such instrument should be placed. Accident here has helped to a solution of the problem; and there would seem to be no sort of doubt that the organ-loft, or as it is sometimes more correctly called, the rood loft, is the best place for the organ, and the organ the best of instruments. Salisbury Cathedral, out of many others, is now most perilously and unfortunately in a state of transition between the destruction and neglect of the last generation of men, and the foolish care and still more fatal improvement of the present day. It is proposed to restore Salisbury Cathedral; and it is truly melancholy to think, even for a moment, of what this really means and implies. Shortly, it means that after all is done, there will be little or nothing of the old cathedral left but the bare carcase of it. But of this another time, our present business being with the organ itself, and its proposed arrangement, as indicated in Mr. Scott's "Report," issued but a week or two back. If that report be attentively read, it will conduce to much clearness of comprehension, and serve to make this slight notice more intelligible and convincing. It may save the organ. If there be one thing more than another more sure and certain as a matter of principle as regards the arrangement and mechanical construction of an organ, it is this, that the whole of the instrument, though it is composed of so many different parts, is in effect *one* instrument, and only one. Just as in an orchestral band, the whole of the instruments, though so different in form, and sound, and power, are meant to produce, when combined, the effect of one, just in proportion to the skill and genius of the individual performers who compose the whole of it. This, as it seems to me, exists in the very nature of an organ. Distribute the different parts of an organ about a building, and you destroy the very nature of it, and do all that is well possible to weaken and confuse it. This it is now, unfortunately, proposed to do, with the organ at Salisbury Cathedral, even after the warnings and miserable failures of S. Paul's and Westminster Abbey. Mr. Scott proposes, or some one does for him, to cut up the Salisbury organ into pieces or sections, putting a part on the organ loft, where it now is and ought to be, a part behind the stalls of the choir, and a part, of all places conceivable, up in the clerestory roof, and thus cutting what is and ought to be a single instrument, into four, perhaps into five distinct and separate parts. What would be said if Sir M. Costa, at Covent Garden, were to divide and separate his fine band by leaving some of them in the pit, putting some in the boxes, transporting the wind instruments to the back of the stage, and lifting the fiddles into the roof, and then, strangest thing of all, promising to bring them all together again by "electric action!" It would certainly be a very curious experiment to try, and might well puzzle the most famous and skilful of composers to write anything for such a band and so placed. Surely Mr. Scott, or those who do his work for him, do not recollect that the sole object of "electric action" is a purely mechanical matter, and serves but to bring the fingers of the performer practically nearer to the pipes, but that no electricity or anything else will annihilate the interval of time necessary for the *sound* from each individual pipe in an organ reaching the ears of those who listen to those sounds from them. An organ pipe close to the ears of a performer or conductor would of course reach the ear instantaneously, but another pipe in the roof of a building, though sounding at the same precise instant through the medium of electric action, would be likely enough to be a bar or two behind to his ear, from the simple fact of the sound from it taking that time to travel before reaching his ear. What has electricity to do with it, or how can it help to diminish this interval of time, the two pipes sounding together during the same instant? Surely all this contemplated and certain failure is simply to know nothing whatever about the matter architecturally, musically, or in any other way. Sound travels at the rate of 1145ft. in a second of time, and is comparatively a slow rate of travelling, as anyone may *see* by watching the stroke of a hammer at some little distance off, and waiting for the sound of it to reach the ear. No proposition for the destruction of an organ could be more fatal than this—fatal in every way, for it compels the organist, whatever his powers may be over the material instrument, or whatever his mechanical precision, to miss his mark and to fail. Why Mr. Cooper himself, whose powers seem to me little short of miraculous, could not get over such a difficulty as this; no "electricity" will enable him or anyone else to triumph over the difficulties created by the "improvements" in S. Paul's, and what is now proposed to be done at Salisbury is, if anything, even worse, and more perplexing, and utterly destructive of accuracy and delicacy of performance. One thing more. Mr. Scott or his assistant in the "Report" talks of lengthening or widening the organ loft, and about the "proportion" between the size of the organ and the size of the loft it stands on, and seems to ask what that proportion ought to be. He may well ask the question, for this simple reason, that it is already answered—fully and accurately and most thoroughly answered—in two buildings, S. Paul's and Westminster. There is a small organ, I suppose it must be called, yet left standing in Westminster, and which looks now as if merely put up on a shelf out of the way for an hour or two, or as waiting to be pulled down, the main instrument being already gone. Is that unhappy fragment in proportion? The other example *was* at S. Paul's, and if a section showing the organ and screen be attentively studied it will be found that no more perfect way of proportioning an organ to the size of a cathedral, and no better way of putting it on a supporting base can possibly be hit on. The vaulted roof under which the organ stood, the screen on which it rested, and the size of the organ were as nearly harmonised, and as admirably put together as could be, and did infinite credit to that knowledge of proportion and outline for which Sir C. Wren was so justly famous. Mr. Scott wants to know, after all his chances, what proportion is, and means? We answer, there it is, or rather was, but must be seen now in a section of the church, drawn on a fragment of paper! r. Gladstone says that this great country is daily improving, and all we want now is education universally diffused. What is the amount, may we ask, of education to be got, if any is, out of S. Paul's or Westminster, or Salisbury, and who are they who are to get most out of them—the few, or the ignorant many? May we not hope therefore that before the Salisbury organ is tampered with or destroyed, that these important considerations and facts will have some weight and be duly considered, and that the properly effective mode in which a large organ should be put together will be taken into account by someone who at least knows that it is something more than a mere collection of noisy metal tubes and "electricity!"

C. B. A.

WATER SAMPLES.

AFTER giving us a report, and then the minutes of evidence on which it was based, the Royal Commission on Water Supply has now issued the Appendices. Everybody observed in the Report a comprehensiveness and clearness of arrangement unusual in Parliamentary Blue Books, and the appendices show those desirable qualities in an equal degree. Mr. Pole was the very man to be appointed Secretary to this Commission. Formerly a professor of mathematics, afterwards the manager of the official business of one of the eminent water-works engineers in Great George-street, and after that time a professor of Civil Engineering, he had all the qualities requisite for the occasion, and if opinion differed before the appointment, the reports and appendices of the proceedings have proved the propriety of the appointment. Being charged by the Commission with the collection of samples of water from the sources proposed by Mr. Bateman, and those proposed by Messrs. Hemans and Hassard, Mr. Pole first obtained from those engineers their pamphlets and other information, and then consulted Dr. Frankland, to whom he was instructed to deliver the samples for analysis, on the mode in which he would wish them to be collected and preserved, and the quantity of each sample. Mr. Pole found that in considering the quality of the water likely to be afforded by any particular gathering ground, it was necessary to notice not only the mineralogical composition of the rocks, but also the nature of the surface of the ground, as regards conformation, covering, and accidental circumstances. Mr. Pole first describes the collection of water from the Cumberland Lake district, proposed by Messrs. Hemans and Hassard as the source from

which the metropolis should be supplied. The rocks in the greater part of this district are such as are usually considered most favourable for preserving the purity of the water falling on them, being practically insoluble, and very little liable to disintegration.

The hills rise abruptly and their sides are steep and rugged, so that the water runs off quickly. This is not only conducive to the purity of the water, from the less time it has to take up foreign matters, but it also tends to diminish the quantity exposed to absorption and evaporation, and so to increase the proportion of rainfall available for storage.

The samples were collected in glass carboys, holding two gallons each, covered with wickerwork, and fitted with ground glass stoppers. They were made expressly for the purpose by the Aire and Calder Glass Bottle Company, four of them being filled for a sample of each of the principal streams, and one for each minor stream.

In taking the water, each bottle was cleaned round the neck and stopper, next rinsed three times with the water it was to contain, and then filled to within a short distance of the stopper. This was fastened down with leather, and sealed, and the leather covered with canvas, a record being kept of the number of the bottle, the exact locality, and the attendant circumstances.

From the lakes, the water was taken by immersing the bottles below the surface out in deep water. From the streams the water was ladled from the running stream with a ladle of ebonite or "hard india-rubber" (a material recommended by Dr. Frankland) attached to a long handle, and was poured into the bottle through a funnel of the same material.

The weather was fine during the time of Mr. Pole's visit, and although he took no accurate gaugings of the quantity of water then running, he estimates roughly that from one-half to one million gallons per day was the fine weather flow from each square mile, or say one-twentieth of an inch in depth per day.

A sample of water from Thirlmere Lake was beautifully transparent and colourless, and the small submerged pebbles were quite clean and free from vegetation, which is generally considered a sign of freedom from mossy contents in the water.

Before Mr. Pole started on his journey he and Dr. Frankland considered where the several samples should be taken, but when he arrived there he found local circumstances in some cases interfere with their preconceived opinions, and he had to exercise his own judgment as to where the different samples should be taken so as to fairly represent the quality of the water of the district generally. Lead mines also also claimed attention, and Mr. Pole gives in this appendix a succinct description of the manner in which they defile the water.

This Cumberland lake scheme of Messrs. Hemans and Hassard, civil engineers, is illustrated by a plan of the gathering ground, a sketch map of the route of the conduit, detailed cross sections of the several portions of the conduit, showing the intention to construct it differently in different parts so as to utilise the local materials, and other drawings, from which it seems there are some remarkable features in the scheme; and they are briefly these:—

A tunnel, nearly eight miles in length, divided into 20 sections by 19 shafts, varying from 100ft. to 400ft. in depth. The tunnel begins in 30ft. cutting, and the inclination is 2ft. per mile.

Another tunnel is still more remarkable, being six miles long, with only two shafts, those being 500ft. deep, and the summit of the hill being 1150ft. above the level of the tunnel. There thus being nearly two miles from shaft to shaft, the time occupied in driving this tunnel must be of great length.

The third remarkable featute in the scheme s the use of wrought-iron pipes 8ft. diameter, r crossing valleys. Three plates are bent into a circle, with butt-joints and covering-plates, and round the circumference the tube is stiffened by T irons and angle-irons, the whole riveted together.

Mr. Pole also visited the district at the head of the River Severn, from which Mr. Bateman, C.E., proposed to take water for the supply of London, and there took samples in the same manner as that described above.

It had been alleged that there were lead workings in the Severn district which would have an injurious effect on the quality of the water, and Mr. Pole investigated the subject with a view to meet this allegation. He found several workings of this kind, and at one of them a curious effect was observed on the trout and salmon inhabiting the waters proceeding from one of these lead workings. They became of a black colour, beginning at the tail.

The streams of water are coloured by peat, being brown, but perfectly transparent, except in the lower ground where the rivulets run over the alluvium of the flatter lands; here the water was turbid.

The volume of water in these mountain streams changes very rapidly. In one case Mr. Pole observed that at 2½ p.m. on the 6th day of the month, the quantity was 130 million gallons per day. At 3½ p.m. on the 7th, it had fallen to 90 millions, had lost its turbidity and had become transparent, but had retained its brown colour. At 8½ p.m. on the same day the volume was reduced to 50 millions, and at 8 a.m. on the following day to less than 30 millions. These rapid changes in appearance led Mr. Pole to think that, although the peaty brown colour may be a constant characteristic of the streams in rainy weather, the turbidity is only a transient effect following immediately from rain, and disappearing very soon.

The two eminent analytical chemists, Dr. Frankland and Dr. Odling, to whom these water samples were submitted agree that they are exceedingly suited for the supply of towns. They are of fair appearance and aëration; contain but a small proportion of dissolved mineral matter, and are extremely soft, but unlike many other soft waters they exert no sensible action on ordinary lead. They contain, moreover, but small proportions of organic nitrogen and carbon (organic matter), and have not been at any time subjected to previous sewage contamination.

As the Commissioners had to inquire into the efficiency or otherwise of the existing sources of supply, as well as into new projects, they entrusted the taking of the samples from the Thames and its tributaries also to Mr. Pole, M.Inst.C.E., F.R.S., and he divided the samples into four classes, viz.:—(1) Those from the head waters of the Thames, above Lechlade; (2) the main stream; (3) the more important tributaries, north and south; and (4) certain outlying waters. The portion of the Thames basin above Lechlade is about 400 square miles area, the principal streams of which are the Chillbrook, the Churn, the Gloucestershire Colne, the Leach, the Ray, and the Cole. The surface of this drainage area consists almost entirely of porous rock of the upper and lower oolite formations, interspersed with small areas of other formations. The oolites are covered generally with only a few inches of soil, and the rain is quickly absorbed. The supply to the streams is therefore principally from springs. The Seven Springs were yielding 150,000 gallons per day, and the Syreford Spring, at the source of the Colne, from three to four million gallons per day. Three of the springs from the upper oolite were yielding respectively as follows:—(1) Thames Head, three million gallons per day. (2) The Bogwell Spring from one to two millions. (3) The springs in Ampney Park, about two miles east of Cirencester, between five and ten million gallons per day.

Samples taken from the main stream from Lechlade down to Hampton, and from the various tributaries, as well as from some outlying waters, showed that the water of the main stream was much better than from the other sources, and increased in quality for domestic use downwards, until at Hampton, where a great part of the present supply is taken, the quality was better than anywhere else except the comparatively small supply from the Bagshot sands. This subject of the quality of the Thames water was fully gone into when the first Report appeared, and will be in the recollection of readers of The Building News.

THE SANITARY ASPECTS OF THE METROPOLITAN BUILDING ACT.

On Tuesday week a deputation from the Metropolitan Association of Medical Officers of Health had an interview with the Home Secretary, in order to bring under his notice some alleged serious deficiencies in the Building Act, which have an important bearing upon the sanitary arrangements of the dwellings which are springing up in all directions around London. The points chiefly dwelt on by Mr. Liddle (who headed the deputation), Dr. Tripe, Dr. Vinen, and Dr. Aldis, who addressed Mr. Bruce, were the practice of erecting buildings upon deeply-excavated ground, which had previously been filled in with rubbish containing a good deal of unwholesome decomposible materials, without the protection that would be afforded by a layer of flagstones or concrete at the foundation, and also that of building upon wet and undrained land. Instances were mentioned in which the surveyors of the metropolitan district boards, contenting themselves with the deposit of plans for house drainage, took so little further interest in the matter that builders either put in no drains at all, or made a pretence of putting them in, without any communication with the sewer, or departed from the plans deposited from motives of economy. They also drew Mr. Bruce's attention to the evasions which were practised in respect of the 29th section, which provides for the ventilation and lighting from the outside of all the inhabited rooms of newly-built houses. Mr. Bruce, in reply, expressed his general concurrence with the views of the deputation, and in the necessity there was for an amendment in the statute. He considered, however, that this matter formed a part of a more comprehensive scheme of sanitary legislation, and that it should be dealt with by the Government when the Sanitary Commission now sitting shall have made its report. He was reminded by Dr. Vinen that the inquiries of the Commission excluded London, but replied that though such was the case, Government would not be thereby deterred from including the metropolis when the question of amendment in the sanitary laws came under consideration.

Testimonial to B. R. Green, Esq.—We notice with pleasure an event of interest in the world of art. In June last the Artists' Annuity Fund expressed by unanimous resolution its high sense of Mr. Green's services as secretary during more than twenty years. A committee consisting of Messrs. Abbott, Atkinson, Cooper, Dighton, Morris, Radford, and Willmore, undertook the task of giving substantive and enduring effects to this resolution. The object was warmly supported, and although subscriptions were limited in amount and restricted to members—the primary and essential purpose being an expression of the esteem Mr. Green's conduct has secured—a handsome timepiece, and a purse of £50 have been provided. The presentation took place at Freemasons' Tavern on Tuesday evening the 22nd inst., Captain Dighton, past president of the society, and treasurer for the testimonial, accompanying the gift with a warm and effective eulogium.

Brompton Barracks.—During the present year various improvements are to be commenced at the School of Military Engineering, Brompton Barracks, costing £21,000, a vote on account of which is inserted in the Army Estimates for 1870-1. There is to be an alteration of the entrance to the barracks, and new schools of instruction are to be erected. It is expected that the ground now occupied by the hut barracks will be taken over by the Royal Engineering Department, for the better carrying out of the instruction of the officers and men of the corps of Royal Engineers.

The Surveyor.

A PLEA FOR CULTURE IN THE PROFESSION OF A SURVEYOR.

At the Institution of Surveyors on Monday evening the discussion on Mr. Squarey's paper on "Farming Covenants" was resumed, and occupied the whole evening. Mr. Jeremiah Matthews's paper on the above subject was therefore taken as read, and will be discussed at the next meeting. After some introductory observations on technical education, Mr. Matthews said:—

The landmarks of the profession have been broken up in consequence of this inevitable subdivision of labour. Take our own profession as an example, and consider how it has grown up. We have a recognised existence, we have grown into an institution. In the beginning of the career of many of us the modern surveyor was unknown. The owners of property had for the most part legal professional men as their confidential advisers, who collected their rents and managed their estates, generally in a very efficient manner. The surveyor occupies a simply subordinate position—generally employed by the professional man and without any particular training, except what he acquired by his own practical experience. But now, stimulated by the vast improvements in agriculture, by the rapid development of our mineral wealth, by the immense extension of railways, and by other causes, the surveyor has gradually acquired an independent position; he is now himself the confidential adviser of owners of property, instead of being dependent on other professional men for employment.

It is well for us to be reminded of this gradual continued increase in the importance of our profession, in order that we may be more impressed with the necessity for a simultaneous expansion of our education and culture.

To what, then, has our profession grown, and for the fulfilment of what duties should we seek to qualify ourselves? We must have a thorough knowledge of the agricultural value of land, and should therefore be practical farmers. For the general management and improvement of an estate we must know something about building and architecture; about draining, surveying, levelling, and the cultivation of timber. We must know, too, the mineral resources of the properties with which we deal, which in itself opens up a vast field of knowledge; we must be familiar with manufacturing and commercial properties; we must be good accountants (not so simple an acquirement as some seem to imagine); and we should at any rate be able to solve *ab initio* those problems in annuities, life interests, reversions, and other subjects, the solutions of which we are in the habit of extracting mechanically from published tables.

This certainly seems a long list of acquirements; but something still more important is demanded from him who would excel in our profession. He must be qualified to act as witness, arbitrator, or as umpire, three qualifications which demand the most careful training. As a witness he must have clear opinions and clear reasons for holding them, and these opinions he must be able to express in concise and lucid language. As an arbitrator he should have the qualities of an advocate, discriminating those points most favourable to his own case and lucidly enforcing them. As an umpire he should have the qualities of a judge; skill and judgment in weighing evidence on both sides, and selecting only the material points, not stubbornly clinging to a preconceived opinion, but open to the reasons and arguments on each side, and possessing ability to sift them.

The surveyor should also have a literary and logical culture, in which I am bound to say we are, for the most part, deficient, which will enable him, in the reports he has so constantly to make, to arrange his arguments and opinions in the most concise and logical form; and, finally, he must above all things have tact in dealing with his fellow-men; for, as he must advise the wise and the foolish, the learned and the unlearned, he must have the skill to enter into the minds of those he comes in contact with and to see things from their points of view, in order that he may know what kind of arguments will be most likely to convince them.

Now a thorough knowledge of most of the acquirements I have mentioned would require the experience of years. A surveyor cannot be so good a farmer as a man with as good an education and ability who spends his life in nothing else—he cannot be as good an accountant as a professional one—he cannot know as much about building as an architect—he cannot weigh evidence like a judge. Nevertheless, our work is not at present so subdivided that many of the gentlemen I am addressing would shrink from giving an opinion on most of these subjects, or occupying any of the positions I have described. A surveyor, then, who would excel in his profession, should aim in the first place at acquiring a sound knowledge of the rudiments of each of its branches, and then a perfect knowledge of as many as he is capable of mastering; and this is, in fact, a limited form of my general theory of education—viz., that a man should know one thing perfectly, and know something of everything else. I do not mean that he should have a superficial knowledge of other things, but a knowledge which is real in its character though it may be elementary and limited in its extent.

With this view I consider the best preparation for our profession to be a high general education, because I believe that a mind thus trained may be made capable of acquiring the technical details of the profession with a comparatively small expenditure of time and labour. Let us see what branches of learning are included in such an education, and what influence, direct or indirect, they would be likely to have on our profession. For the sake of simplicity we may class them under three heads, science, mathematics, and literature and logic. The direct value of scientific knowledge, especially that of chemistry, botany, and geology in our profession is obvious.

We learn from chemistry the component parts of our various soils and of the plants we grow upon them. We therefore know what elements of the soil a particular plant will assimilate, and hence what we must replace there in order to continue the cultivation of such a plant; in other words, we learn the science of manuring.

Again, a botanist, from his knowledge of plants will see at a glance the nature of the soil on which particular plants are growing, whether it is barren or productive, wet or dry, light or heavy, so that starting with his knowledge, a valuer, with a comparatively short practice, will be able to give a reasonable opinion on the agricultural value of land. The same may be said of the geologist, but, independently of the value of geology in an agricultural point of view to the surveyor who has anything to do with the immense mineral properties of this country, a deep knowledge of this science is indispensable.

The knowledge of mathematics, even of a high order, is of direct benefit. Including the more elementary knowledge of figures in this subject, it is of course essential that we should have a thorough knowledge of book-keeping, of the best methods of keeping our farm, estate, and other accounts. Questions of life interests and reversions, &c., require a considerable knowledge of mathematics for solution, and, though we are supplied with tables which solve most of such questions without our thought or trouble, yet cases often arise in which our tables are not applicable, and it is therefore on all accounts desirable that we should be able to solve all such questions by the light of our own knowledge.

But, independently of the direct practical bearing of science and mathematics, their indirect value in training and disciplining the mind is incalculable. No matter what we are engaged in, all through life it is our great interest to find out the truth about matters we are concerned in. To do this we must be able to judge correctly of the facts which come before us, an ability which constitutes one of the greatest distinctions between one man and another, and to do which with effect needs all the resources which the most perfect system of intellectual training can command. For this purpose the value of the study of mathematics and science is essential.

Mathematics teaches us the method of arriving at truth from reasoning. It obliges us to lay down with exactness and precision all the premises from which we mean to argue, to keep each step in one argument distinct and separate from every other step, and thus to cultivate a habit of mind necessary to the elucidation of truth.

Science shows us how truth can be arrived at from observation. We do not all profess to reason, but we all of us profess to draw inferences from observation, and I may safely say that no man who is not a student of science can form an idea of what the difficulty of reasoning from experiment or observation really is, or how cautious it is necessary to be if we would avoid false inferences.

I might speak at some length on the bearing of literature and logic, both directly and indirectly on our profession, but by so doing, I fear that I should exceed my proper limit. I will merely observe that one of the greatest wants in our education is the power of expressing our thoughts and opinions in graceful, logical, and grammatical language. We may have arrived at a correct conclusion, either by sound reasoning, or by a correct judgment of evidence; but few of us have the art of writing down, or expressing clearly, the way in which we have arrived at it, laying down, when necessary, first the premises from which we start, then the various steps of our argument, arranged without confusion, and stated without prolixity, so that our conclusion may be at once natural and convincing.

This art can certainly be best acquired by a study of literature and logic.

From these remarks you will understand that I recommend for our own education, before we seek to acquire the knowledge of the technicalities of our profession, a wide mental culture such as is generally thought necessary in the older established professions. It is needless for me to enlarge on the indirect advantages of such a training. I mean those advantages which are independent of our profession. We all of us have our times of leisure, but we do not all know how to use them best, and this culture must certainly teach us how to employ our leisure with the greatest pleasure to ourselves, and the greatest benefit to our fellow-men.

Let us suppose, then, that this idea of a general cultivation of intelligence is a reasonable and noble one. Shall we by following it out detract from our practical use? It is the nature of some people to value an idea in and for itself, irrespective of the practical consequences which may result from it; but we English delight to call ourselves a practical people, which may be interpreted to mean a people inaccessible to and impatient of ideas. Prescription and routine have more hold upon Englishmen than most other people, and so when we change any of our customs, we change them not because they are antiquated or irrational, but because they are practically inconvenient.

What, therefore, I have been endeavouring to show is this, that the training I advocate is not only not inconsistent with the best technical knowledge, but that it is a very great assistance, both directly and indirectly, in acquiring proficiency in the higher walks of our profession.

The question now arises—Where can we best obtain this culture?

I certainly know of no place comparable to the Universities for this purpose. They are *par excellence* the seats of learning, and possess the greatest facilities for uninterrupted study and instruction in those branches of culture I have mentioned. I do not say that the course of instruction and training is altogether a perfect one. I believe that in some respects it might be greatly improved, and that the number of such seats of learning might with advantage be increased. But great improvements have been of late years introduced, and greater still are even now contemplated, and they are, at any rate, the most perfect and complete we have.

Moreover, a student has the additional advantage of being of necessity brought early into contact with many cultivated minds widely differing from his own. This, in itself, must have a tendency to widen his own mind, and is a means of acquiring that tact and knowledge of men which is an education in itself, and of incalculable practical value in our own profession.

But many object to an University training for us, and these objections may be thus briefly stated.

First.—It is a wasteful, unproductive expenditure of time and money.

Secondly.—There is a great danger of acquiring there idle and expensive, or frivolous and dissipated habits.

Thirdly.—Even if such habits be avoided, there is the danger of acquiring tastes or knowledge which will actually unfit the student for the drudgery which must be necessarily gone through in learning the technical details of a surveyor's profession.

With respect to the first objection, I have already endeavoured to show that the expenditure is not necessarily unproductive. Independently

of the humanising influence of the culture I am advocating, and speaking in a strictly commercial sense, I regard the time and money as capital invested in a particular way, and much more likely than many commercial ventures to be repaid with abundant interest.

On the second objection I may remark that it is manifestly much more beneficial to a youth to be brought up with a knowledge of temptation combined with the power of resisting it, than to be brought up simply in ignorance of the temptations to which he may be subjected when thrown upon his own resources.

Every youth of eighteen years ought to possess that knowledge and self-respect which will enable him to conduct himself with propriety when removed from the direct personal influence of his parents or guardians. The fact of his not possessing these (probably due to defective previous training) may certainly be a reason for artificially keeping such a youth out of temptation, but is no reason for condemning the general system of sending youths to the universities. Moreover, there are manifestly less temptations to evil in the country than in large towns, and yet, I think, few will be found to advocate an education in a country office in preference to a town one. The great benefit to be derived by a youth from contact with the mental activity of a town, notwithstanding its increased temptations, is far superior to that which he is likely to derive from the too general mental stagnation of the country; and, for the same reason, a still greater benefit may be expected from the stimulant of mental activity and competition in places like our universities.

Again, I by no means admit that a youth is more likely to acquire vicious habits by residence at an university than in a town or country office. A youth of eighteen will naturally expect a certain liberty of action; he will, naturally, have his own intimate associates, and it is by a choice of these that his future habits will probably be determined. Now, at an office—whether in town or country—his choice is necessarily limited; he may almost of necessity be thrown into very indifferent company, and it is certain that he will have a greater choice of bad associates than good ones. But this is not so much the case at the universities; few may be said to be absolutely bad, few who do not possess some of the feelings and habits of gentlemen; while a youth, ambitious of good, can always find there congenial friends.

With reference to the third objection, I must say that it appears to my mind to be very much the same as the one we used to hear, years ago, against teaching reading and writing to the working classes—viz., that we should educate them above their work. I certainly thought such an objection was now condemned to retirement in the most rural districts, and, at least, confined to the agricultural labourer. We have surely not now to learn afresh that it is the man who dignifies the work and not the work which dignifies the man; and that the commonest work will be better done by a man with some mental training than by one without.

I can conceive no kind of work more monotonous, or which involves more simple mechanical drudgery, than part of the work of an astronomer, who spends hours, nay, even days and weeks in pointing an instrument to a particular object, whose path in the heavens he wishes to investigate, and jotting down on paper his observations. He goes through this drudgery because he has a prospect of being able, at some future time, to exercise his mind on his mere mechanical observations. Surely, if this be cheerfully done in a science which has for its aim the solution of the most profound problems of the universe which can be presented to the mind of man, the drudgery of a surveyor's office necessary to acquire the technical details of a profession which in its highest branches certainly demands great thought and intelligence need scarcely be considered unfit for an educated man to go through.

Doubtless many cases may be pointed out of youths who have failed in their profession after an University training. But to argue against a general system simply from such instances is to fall into an error which I have previously mentioned—viz., that of drawing conclusions from partial and imperfect observation. Before we can draw any trustworthy conclusion on the subject, we should at least know the cases of those who have failed without this training, and of these we could most of us record many instances both in town and country.

I am, then, in favour of an University education for members of this profession where it is practicable, but there will, of course, be many exceptions to this, as to every other general rule. The means may be wanting, or the youth may be peculiarly unfitted for such a course. All we can do is to lay down an average system and leave each one to judge for himself of the weight of any exceptional circumstances in which he may be placed.

I know that the greatest ornaments of our profession have not had these educational advantages. But let them remember that only men of more than average intelligence, men who would have succeeded in almost any sphere, and under almost any disadvantages, could have raised our profession to its present standard of importance, and that this standard will have to be kept up by average men.

We must all remember, too, that schools and colleges are not the only places of education. The world is a great theatre of instruction as well as of of action, and the actual wants and business of the age in which men live form them for acting a proper part in it. Men of great intelligence without any other hints than those suggested by their situation will hit upon schemes to carry on improvement in the world. Much, however, may be done in the course of education by way of preparing the minds of men for improving such opportunities as occur.

Finally, we must remember that education, like everything else in this world, must be progressive. The most educated man will scarcely be satisfied without endeavouring to impart to his children a higher education than he possesses himself. Manufacturers and tradesmen are at last beginning to understand this, and to appreciate the value of the culture I have been advocating. Let us, too, recognise it that we may retain and increase the reputation for morality, mental acuteness, and practical utility which the distinguished men in this Institution have already earned for our profession.

BATTERSEA CHAPEL.

We give this week an illustration of the proposed new chapel for the Baptist congregation formed in 1797, which has been projected by the present pastor, the Rev. I. M. Soule, who has held that office for the last 32 years. During that period above £5000 has been expended on the old chapel and the schools.

The new chapel will occupy the site of the old, which has been widened by the purchase of the adjoining land required. It is designed to accommodate about 900 persons, and is estimated to cost about £3500.

The architect is Mr. E. C. Robins, of Southampton-street, who has chosen the Romanesque style, as most readily adaptable to the exigencies of the site, which is still much confined. Galleries on three sides are provided, that at the end being considerably deepened by its extension over a weekly meeting room for 100 persons. The building will be faced with white bricks, with Bath stone dressings, and is to be commenced at once.

EARLY CLASSIC ORNAMENT.

Vivant Denon, in his "Egypt Delineated," tells us that the ancient Egyptians expressed certain ideas by certain understood rules, to which the most sacred laws of Art, and even of Nature, were subservient. We cannot, therefore, judge as to the state of the arts by their emblematic figures. But they had a school and a style separate from that of hieroglyphic emblems, and when they wished to exhibit attitude, motion, or expression, they knew how to design from Nature and give the character required.

This is especially observable in their compositions appertaining to religion and majesty, but where hunting, warlike, or domestic subjects are employed, the figures lose much of their rigidity, and a spirit of greater originality pervades throughout. Perhaps the finest example we possess is the marvellous head of the young Memnon. Here the characteristic thick lips, full eyes, and rounded nose, assist to unite art power with natural beauty. This subtile result of Art from Nature is the great charm in all primitive styles, and to further illustrate our subject we would direct our readers' attention to our lithographic illustration of this week on Early Classic Ornament, taken principally from authorities in the British Museum and the Louvre. Of Egyptian work we have selected No. 2, a piece of embroidered mummy cloth, the colours of which are green, yellow, red, and orange. No. 3 is a carved and engraved patera, representing an aquatic flower with its leaves. No. 4 the upper portion of an emblematic ornament, decorating a doorway. No. 6 a scarabeus. No. 7 an elegant little cup, enriched with lotus buds and flowers. No. 9 an offering of flowers, &c., painted on a very perfect mummy case, preserved in the Museum of the Royal College of Surgeons. No. 10 is from a mural painting in one of the mountain tombs west of Thebes.

No. 1 is an Assyrian figure presenting offerings. No. 6, also Assyrian, is an ivory ornament composed of gryfons and papyrus flowers; it was found in the N.W. palace of Nimroud, and is probably the back of a mirror case. It is beautifully carved and inlaid, and has been partly overlaid with gold. No. 5 is of Etruscan origin.

Further illustrations on the subject of early Classic ornament will be found in The Building News of September 4, 1868, and January 29, 1869.

O. W. D.

AN OBSCURE WORK OF ART.

The territory of Dalmatia is so far removed from the most frequented highways of the world, that the character and history of its works of art, says the *American Builder*, are not generally known; few travellers have visited the largest of its towns, fewer have climbed up the steep passes of Montenegro and visited the once famous convent of S. Dyonisus, originally a temple of Juno, but since changed into a Christian church.

Though possessed of great architectural finish, this temple has not, we believe, been fully described, and the details given verbally by a gentleman tourist, who visited the convent, may prove of interest to the curious reader.

The ancient temple was taken possession of by Greek Monks of the Mount Athos early in the Christian era, and has from that time been constantly occupied by brothers of the order. The temple forms a long parallelogram, 60ft. by 180ft. in dimensions, and had originally seventy columns of the Corinthian order of architecture, of which only twelve now remain standing, and forming the front of the church as it is. The height of these columns is 45ft., and the workmanship exhibited upon them is of the highest order of art.

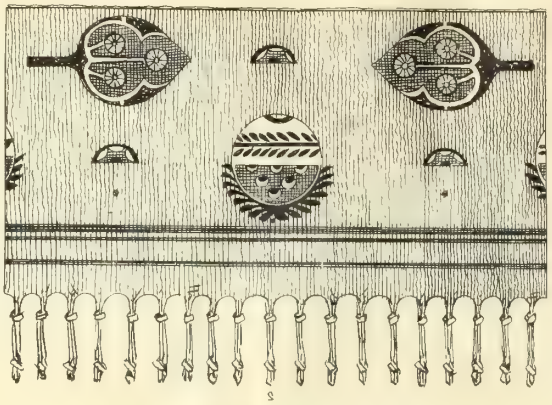
The acanthus of the capital is of most beautiful design, and the frieze as well as the cornices show festoons of flowers and fruit of great merit. The principal cornice is almost entirely destroyed, with the exception of two figures of Bacchantes with flowing garments and crowns of olive leaves in their hair, which are now worshipped by the monks as images of saints. The floor is covered with broken figures and columns, and the greater part of the Venetian tower of the monastery is built of the ruins of the temple. The interior of the church contains a marble statue of S. Dionysus, as the monks inform the traveller, of colossal size, but which is evidently a relic of the temple, a representation of Zeus or Jupiter, with the eagle at his side.

Part of the floor of the crypt is well-preserved, and the broad border of vine and palm leaves; the figures in the centre represented probably Juno, and a marriage procession.

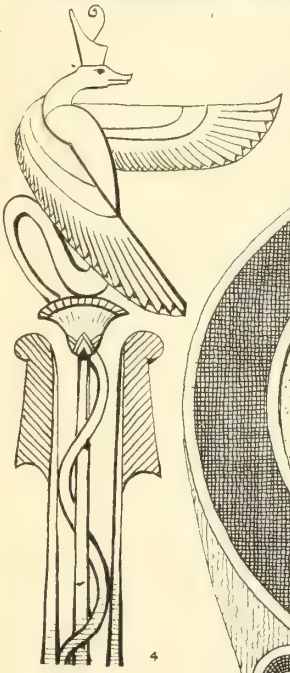
Altogether this ancient temple is of great interest to architects and antiquaries, as it is probably one of the best preserved relics of the golden era of Grecian architecture.

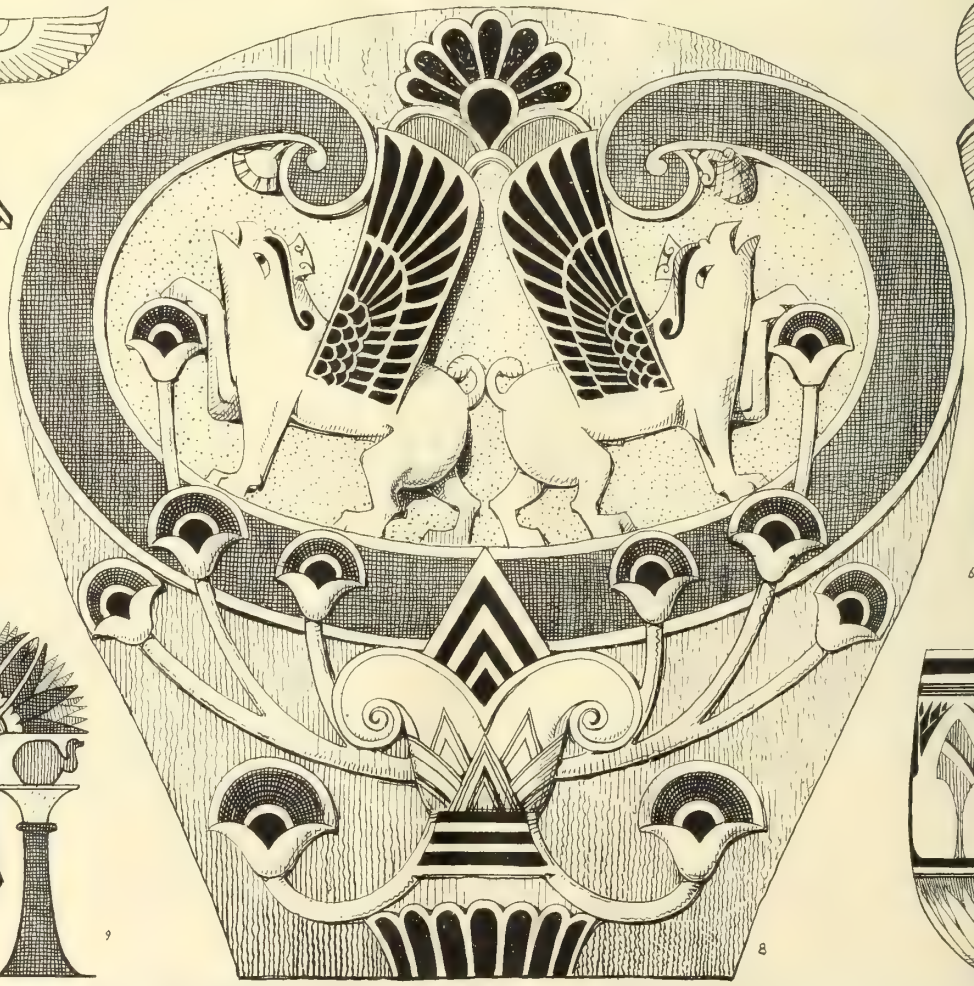
The South Metropolitan Tramway.—The new line of tramway laid down from Brixton Church to the old toll-house at Kennington is now nearly completed; some few yards at either end require paving, and the line to be cleared of the loose ballast, when the metals will be ready for the reception of the tram carriages. A portion of the tramway at the west end is constructed with a single line, but the main portion consists of a double line of paved way and metals. The vehicles to be used are capacious, and well fitted up for first and second-class passengers. They were made in America, and imported to this country in a complete form. It is proposed to open the tramway for public traffic on the 5th of April, from Brixton to Kennington, at very low fares; and the tramway will subsequently be extended to Westminster and Clapham during the ensuing summer. The omnibus proprietors on this road will run at tramway tariffs, and a very spirited opposition is anticipated.

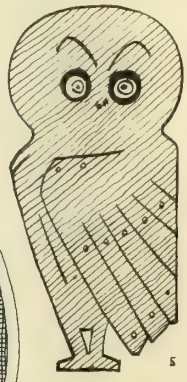




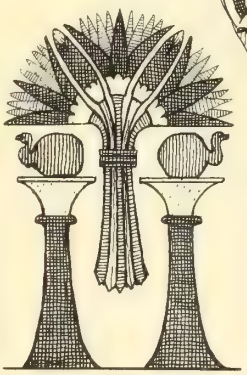




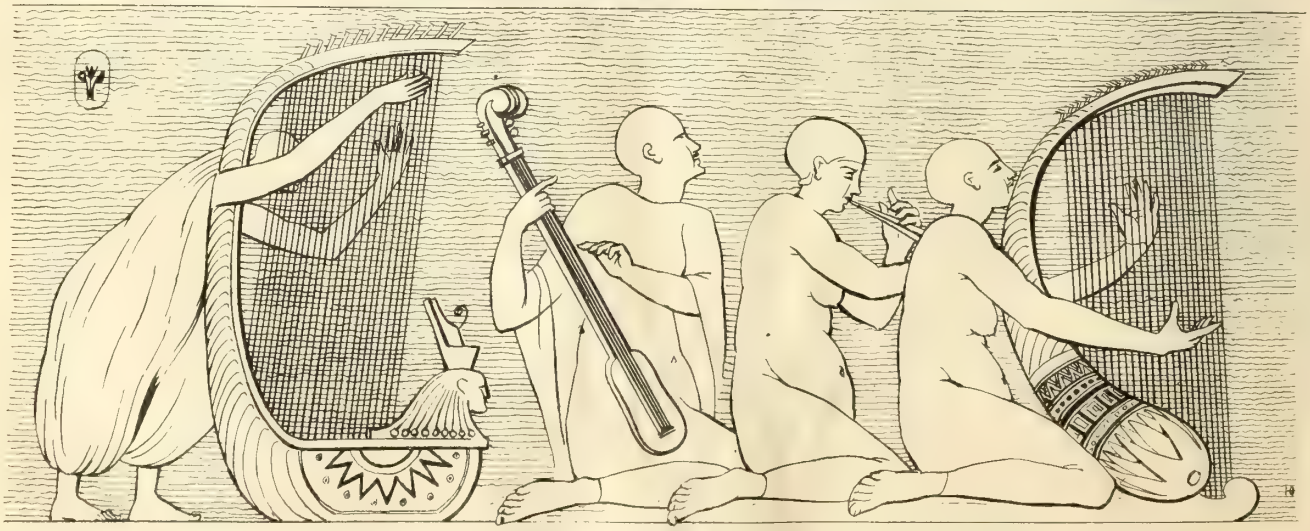












EARLY CLASSIC ORNAMENT: DRAWN BY OWEN W DAVIS.

Printed by Whiteman & Bags

Owen W Davis del et lith

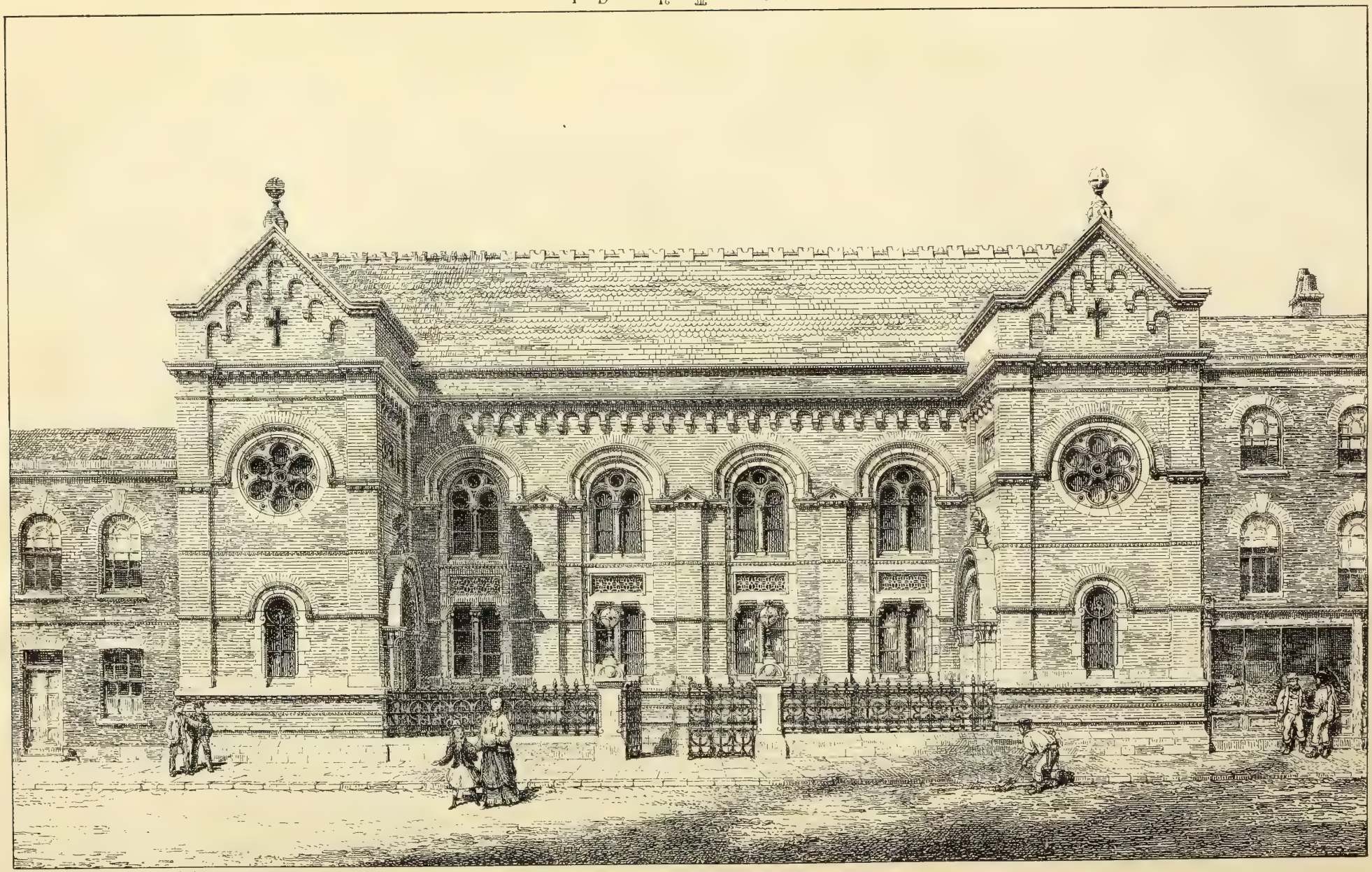
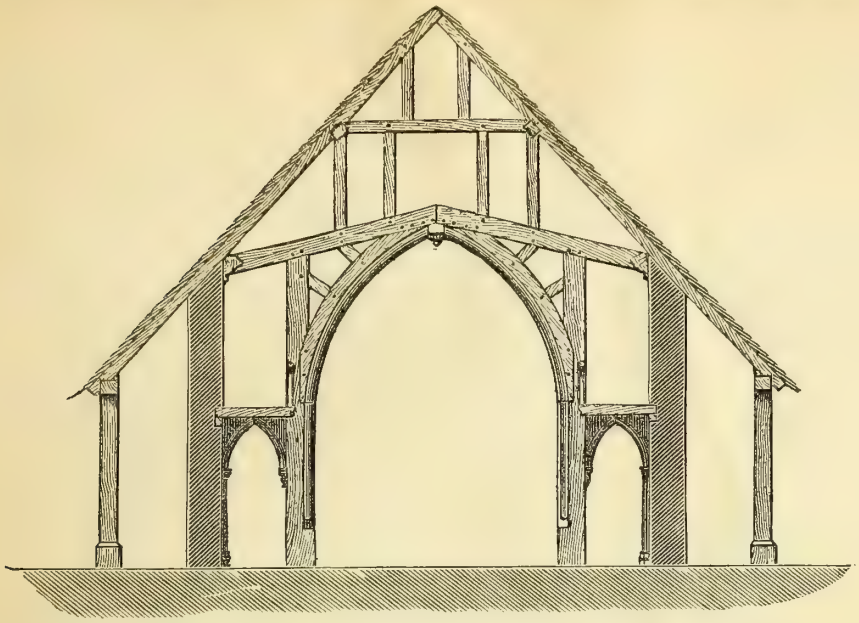


Photo-Lithographed by Whiteman & Bass London.

Battersea · Chapel. — EDWD C. ROBINS, ARCHT



Section of an Ancient Building at Coventry.

BRIEF CHAPTERS ON BRITISH CARPENTRY,

By Thomas Morris.

(*Continued from page* 218.)

We have been regarding at Ightham and Mayfield works in stone of the fourteenth century, a century of unexampled architectural splendour, involving the entire range of that elegant, vigorous, and finished division of the Pointed style characterised by flowing lines and exquisite tracery, called the Decorated—the manifestation of graceful maturity in mediæval art. The practice of vaulting cathedrals and principal churches with stone had from an earlier period called the conditions of structural stability into special action, and the exigency of flying buttresses had (before A.D. 1200) been displayed in a remarkable manner at Lincoln Chapter House, where the diameter of the room, including walls 4ft. thick, is but 70ft., yet swells, with the buttresses, to 140ft. The available building is a mere nucleus, occupying but a fourth of the area, in fact, taken up. Walls and piers were the appointed bearers of loads, and if subjected to side strains, they were fortified by buttresses. It would not always increase our admiration of buildings if we examined too closely the amount of propping they require, and we might sometimes regard that as a preposterous invention, which formed one of the cautious steps of early artists towards their ultimate triumphs. That their imagination was ever active, their judgment ever vigilant, is witnessed in the Chapter House at Salisbury; and that a paramount importance was accorded to *design*, is made evident by the wooden vaultings of the noble octagon at York. The thirteenth century architects have there left evidence of a grand intention, but the want of later expedients obliged them to elect between abandonment, disfiguring counterforts, or execution in a light, but (when made to do duty for stone) simulative material.

The inference I desire to carry onward is that builders of old were perfectly conscious that vaults and arches do not bind and tie walls together, but have a disposition, more or less active, to thrust them apart. Whenever, therefore, we meet with arches or curved pieces in timberwork, let us assume their intended operation to be by repulsion, and the support they afford that of passive resistance. It is necessary to say this, because the extent to which old rules have been overlaid and obscured by other systems is not commonly or sufficiently perceived.

Among the causes of a generally imperfect acquaintance with ancient carpentry may be included the lax and indiscriminating way in which merely antiquarian and amateur writers are accustomed to jumble technical terms of different epochs, dissimilar styles, and opposite principles, professing to teach an art of which they have no practical knowledge, and every word of whose vocabulary they misapprehend and misapply. This need not be discussed in detail, but will become apparent as we proceed.

This engraving illustrates the notion of a gabled roof in timber, and it is not unlikely that the great barns of monastic establishments offered plentiful instances of similar construction. Professor T. L. Donaldson has noticed that many tithebarns existed in Wiltshire, "and with their centre and side aisles partook of a church-like character, while their roofs presented the finest combinations of carpentry that could be brought forward."

(*To be continued.*)

THE TRANSFER OF LAND.

The Lord Chancellor's bill to facilitate the transfer of land was issued on Tuesday.

The first part, which relates to the registration of the title without the interference of the Court, provides that any person who has contracted to buy an estate in fee simple in land, or any person entitled for his own benefit at law or in equity to any such estate; or any person capable, either alone or with the consent of other persons, of disposing by way of absolute sale of an estate, whether subject or not to encumbrances, may apply to be registered as proprietor, provided that in the case of encumbered land the encumbrancer, or if there are more encumbrancers than one, a majority in value of them, consent to the application; and that in cases where the applicant cannot dispose of the land without the consent of some other person, the person whose consent is required concurs in the application being made; and that a mortgagee shall not be entitled to be registered as proprietor without the consent of the mortgagor. The registration of any person as first proprietor of land shall confer on the person so registered an estate in fee simple in such land, together with all rights, privileges, and appurtenances therewith enjoyed or reputed as belonging or appurtenant thereto, subject to any adverse estate, interest, or title subsisting in or to the land at the date of the entry thereof on the register; to the encumbrances, if any, entered on the register; and to such charges and interests, if any, as are in this act declared not to be encumbrances; but free from all other estates, encumbrances, and interests. The common law liabilities of land are not to be deemed encumbrances within the meaning of this act.

The second part provides that judicial scales may be made by the Court of the fee simple of land. A judicial title may be given to the purchaser, and the Court will distribute the purchase money. Every registered proprietor of land may in a prescribed manner transfer such land or any part thereof; and upon due transfer being completed, the registrar shall enter the name of the transferee as proprietor of the land, but until such entry is made the transferor shall be deemed to remain proprietor of the land. Upon completion of the registry of the transferee the registrar shall deliver to him a land certificate; he shall also, in cases where part only of the land is sold, deliver to the transferor a land certificate, containing a description of the lands retained by him. On the death of the sole registered proprietor, or of the survivor of several registered proprietors of any land, such person shall be registered in the place of the deceased proprietor or proprietors as may, on the application of any person interested in the land, be appointed by the Court. There are similar provisions relating to bankruptcy and to the marriage of a female proprietor. The Court may, upon the application of any person interested, issue an order inhibiting any dealing with any registered land or registered charge. Where any sale of the fee simple in land takes place after the expiration of two years from the date of the commencement of this act, such land shall be entered on the register before the completion of the sale; if it be not, any conveyance made of the fee simple in such land shall operate only as a contract, and shall not pass any estate in the land. An office, to be called the Office of Land Registry, shall be established, and the business of such office shall be conducted by a board, in this act called the Board of Registry, consisting of the Lord Chancellor, the Chancellor of the Exchequer, and a registrar. This board will divide England into districts for the purposes of registration.

NEWTON ABBOTT MARKET COMPETITION.

(From a Correspondent.)

Eighteen plans were sent to the Wolborough Local Board, respectively bearing the signatures "Fides," "Atlas," "As You Like It," "Perio," "Nota Bene," "Common Sense," "Civis," "Proposer," "Economy," "Leo," "Fides" (with a red cross), "Convenience," "Detur Digniore," "Suum Cuique," "Perseverance," "Alphabet," "Prudentia et Animis," and "Sub Spe." Another plan bearing the mark, a double ring, arrived, but too late to be received in competition for the premiums. It was, however, placed in the room with, but apart from, the competitive plans, for the inspection of the members of the board. The plans lay ten days for their inspection, and then a special meeting of the board, at which every member was present, was held to make the awards, when after two hours discussion, the first prize of £25 was awarded "Perseverance," and the second of £15 to "As You Like It." On opening the envelope, the first was found to be Mr. John Chudleigh, of Exeter, a son of one of the members of the board; and the second a Mr. James W. Chenhall, who has recently taken up his residence at Newton Abbott, and whose interests the Wesleyans are using every effort to promote. Here is another proof that local talent is sometimes appreciated. Whatever is good in the premiated plans is common to some others, while in an architectural point of view they are inferior to many in the room, which are evidently designed by men of experience and ability. The plans were allowed to lay for the inspection of the ratepayers and general public during the following five days, and, strange to say, the visitors expressed great surprise at the decision the board had come to, other plans being thought far preferable, that of "Atlas" having the preference generally.

The Palace of Augustus.—In the excavation on the site of the Palace of Augustus Cæsar, Mount Palatine, Rome, now the property of the Emperor Napoleon, three underground rooms, which apparently belonged to the baths, and of which the walls are admirably decorated with frescoes, have been discovered. Copies of these paintings have been made by M. Layraud, a French artist, and have just arrived at the French Institute. The relics from the villa of Augustus will eventually occupy a room at the museum in the Palace of St. Germain.

Furniture & Decoration.

ON SURFACE DECORATION.

(*Continued from page* 212.)

LET us now consider a few of the modes in which walls were formerly decorated, and perhaps ideas may be suggested which may be of advantage to us now.

In the history of the ancient palace of Westminster, by Smith, we are told that in the thirteenth century, in the reign of that patron of art, Henry III., "it was decorated in high perfection; in one chamber all the warlike histories of the whole Bible are painted with inexpressible skill, and explained by a regular and complete series of texts, written in French over each battle, to the no small admiration of the beholder, and the increase of royal magnificence."

About 1312, Langton, Bishop of Lichfield, commanded the coronation, marriage, wars, and funeral of his patron, King Edward I., to be painted in the great hall of his episcopal palace, which he newly built. Fanciful devices, many a holy text and saintly legend, with various sentences, emblems, and mottoes, which give opportunity to the artist to display his skill and exercise his wit, we see in the remains of this kind of decoration, wherever it is found, and in later times the arms of the sovereign, and the armorial bearings of the family, and other loyal emblems, were often grouped with good taste, producing a rich effect.

Tapestry, the most comfortable kind of wall decoration, was introduced into England, as furniture hangings, by Eleanor of Castile. Previously, needlework tapestry had only been used for vestments, and for the decoration of the sanctuary, no doubt a continuance of the vail in the Holy of Holies in the Hebrew Temple, or for special decoration on festive occasions. It was woven at Arras, in the fourteenth century, and, from its superior comfort, soon became a formidable rival to wall decoration by the pencil. Miss Strickland tells us of Eleanor—"The coldness of our climate must have made it (tapestry) indispensable to the fair daughter of the South, chilled with the damp stone walls of English halls and chambers."

In 1586, the unfortunately-beautiful Mary Queen of Scots describes her miserable residence (*vide* "Raumer's Contribution"). She says:—The walls surrounding the house are so high, neither the sun nor fresh air could penetrate it. The damp, however, is so great that every article is covered with mouldiness in the space of four days. I have for my own accommodation only wretched little rooms, and so cold, that were it not for the protection of the curtains and tapestries which I have had put up, I could not endure it by day, and still less by night."

Tapestry hangings did not remain on the walls as modern hangings do now; they were carried from place to place as they might be required, by the groom of the chambers attending a royal progress, and often, by their want of judgment in arrangement, causing many ridiculous blunders to arise.

I have no doubt that in consequence of the comfort and easy manner of decorating walls with tapestry hangings, the artists of the day gave more particular attention to the decoration of ceilings, as many magnificent ceilings are still to be seen, but accompanied by bare walls.

Excuse me, in passing, remarking that, at the present time, in some of the cottages in France, the paper-hangings are cut into requisite lengths, and fastened to the wall with tin-tacks, not pasted on, so that should the owner remove elsewhere, they can be taken down and removed with the other furniture.

I often wonder that curtains are not now more often used upon walls, as they produce such a rich effect, and can be so easily taken down and cleaned. I have seen them used a few times with the most satisfactory results; pictures can be hung against curtains with the greatest ease, and they form a capital background.

The nearest approach to the old style of tapestry in the present day is occasionally seen in rooms where wall-panels are formed in wood skeleton framing, and covered with rich silk, either divided by another coloured silk, framed with gilding, or with arabesque painting pilasters, at suitable distances, according to the size or use of the room.

A beautiful piece of mediæval embroidery, representing scenes in the life of S. Martin, belonging to the Worshipful Company of Vintners, and kept usually at their hall in Thames-street, is an excellent example of that class of read-work, and in good condition.

Leather has ever been a favourite material for decoration, and especially appropriate for hanging in palaces and large mansions. It affords infinite scope for representing foliage, scroll ornament, flowers, and heraldic devices, of elegant design and good workmanship; capable of receiving sufficient relief in any style to be easily followed by a good colourist and gilder. Spain, Italy, and Flanders, centuries ago, manufactured gorgeous leather tapestries. Later, Germany, France, and especially England, held the first place in its production. The durability of the material, the distinctness of the embossed pattern, the brilliant colouring, the brightness of the gold and silver, capable of receiving the highest burnishing, has made it a favourite in all ages, for we see it from Egypt in the British Museum two or three thousand years old. It was in the Hall of the Lions in the gorgeous Alhambra; and nearer home many chambers are decorated with excellent effect in all the original brightness and beauty. I saw a staircase at Oxburgh-hall, the seat of Sir Henry Bedingfield, a few years since, in which all the panelling was filled in with old leather, the flowers and ornaments of whith had been entirely repainted and gilded; the wood mouldings were painted black and marone and gold, and the whole effect very rich. I do not like it for frieze or moulding ornamentation in imitations of relief. I am heartily glad that the fashion of covering brackets, legs of tables, picture-frames, &c., with leather flowers and leaves has exploded, together with potechomaine and other foolish, useless occupations, which was nothing more nor less than an absolute waste of time. Leather is the only material, except china, which I like to see ornamented with representations of natural flowers in proper colours. It seems appropriate for rich surface decoration, and especially for Elizabethan or Renaissance panelling.

Surface decoration by painting in fresco appears to have been coeval with architecture itself, and is a splendid mode of decorating large edifices. All data concur in proving that some of the Egyptian frescoes must have been painted two thousand years before the Christian era, yet they retain the brightness and freshness of tone they received from the painter's hand.

We are informed by Pliny and other writers that the greatest painters in Greece were engaged in painting in fresco upon the walls of their public edifices. In the Royal Museum in Paris is preserved one of these pictures painted upon a gold ground, representing Apollo and Marsyas.

The Roman people, cultivating nothing so much as the art of war, looked but indifferently upon the arts, considering them as mere decorative occupations, and when Roman conquerors dragged the captive Greeks at their chariot wheels to serve them in ornamenting Italian cities, they were looked down upon by their military masters, and regarded merely in the light of mechanics, the result being a decay of the good taste and simplicity which the Greek painter had perhaps perfected; and gaudy colouring, mosaics and gilding in profusion, displaced intellectual beauty, grace, truth of nature, and experience. In the time of Augustus Cæsar the love of variety and the desire for extraordinary things led many of the wealthy to prefer the glowing fanciful richness of Indian manufactures to the simply elegant subjects of the Greek artists; and the vulgar love of display gave occasion to Apelles to observe to one of his pupils, who had painted "Helen" bedecked with jewellery, "O, young man," said he, "not being capable of making the lady handsome, you have made her rich."

It appears by research that in the dry climate of the land of Egypt, the liquid employed in fresco painting was a finely-prepared size, formed of eggs carefully beaten together and blended with vinegar, forming a substance, when properly made, which appears to have been impervious to atmospheric changes, and only yielding to actual violence.

In Italy and elsewhere lathed ceilings are admirable for the preservation of frescoes; good brickwork seems the best foundation for wall surface, but rubble walls have proved to be the very worst, they are so liable to be bulged and uneven. The frescoes which have been painted upon plastered surface, where the proportion of lime has been about one-third and river sand two-thirds, last better than any other. But whatever the construction of the ceiling or wall may be, the immediate surface for painting the picture must be plaster or stucco, and the greatest care must be taken in preparing it.

In Florence the artists are of opinion that the lime used for the paintings should, after the most careful mixing, be kept in a moist state twelve-months, that it may not burn the colour or the brushes.

The yellow colours used are ochre, Naples yellow, terra di sienna. Reds: burnt ochre, burnt sienna, and all the oxides of iron, from orange to violet. Blue, the only brilliant colour in fresco: ultramarine and cobalt. Brown: umbers and burnt terra verte. Purple: burnt vitriol. Green: chrome green, Verona green, and terra verte. Black: charcoal black and lamp black. These colours have been well tested, and for the most part admit of being mixed in any reasonable way.

The best frescoes in London are certainly the beautifully-painted, richly-coloured figures by the late William Dyce, at All Saints' Church, Margaret-street; and I regret they are so far from the eye that they are not easily seen. Mr. Armitage deserves great praise for the excellent drawing of the figures in one of the side chapels in S. John's Church, Islington; and the soft, delicately-tinted colouring being near the eye, is a great success.

Although there has been so much fault found, and so much said about the fading of the fresco in the Great Hall of Lincoln's Inn, if it was carefully dusted and cleaned with bread, and afterwards washed over two or three times with new milk, it would look as fresh and well as ever, unless there should be found a mouldy efflorescence, owing to the presence of saltpetre in the walls, which is little to be feared, as it is a great height from the ground. Carlo Maratti once cleaned the frescoes of the Vatican with the light wine of the country, and restored them very well.

Smoke has been described as a cause of ruin to frescoes, but its effects have been and can be removed. Damp is by far their greatest enemy; it sometimes ascends through the wall from the soil, or descends from dilapidated or ill-constructed roofs. Of course the greatest care is requisite to be taken of them. As Mr. Wilson informs us, "Many fine works, even by Raffaelle, in the Vatican, and in some of the churches and cloisters, have been irretrievably injured by the populace in wanton mischief." In the church of S. Maurizio, Milan, some of Luini's finest frescoes would be in excellent condition had it not been for such wantonness, for the barbarous hand of man has scraped off the blue colour for the value of the ultramarine, and the gold also with which parts were heightened.

In very early times we have abundant evidence of the extensive employment of encaustic painting. Pliny says of it, "We employ wax as a vehicle of painting, not only from the beauty it gives to the picture painted with it, but also because it is a preservative of the walls which it adorns." Plutarch highly praises it. He says, "Even time cannot efface it."

Many who have thoroughly inquired into these matters are of opinion that the greater part of the mural paintings discovered in the catacombs, Pompeii, Herculaneum, &c., have been encaustics, although there are counter opinions, concluding them to be in distemper. Many authors mention this process of art, and although it does not appear that it has been practised here until very recently, it seems more fitting to our climate than any other kind of painting. I hope to see some magnificent pictures painted in encaustic, even in our neglected S. Paul's Cathedral. The method is very simple. Pure wax is broken or cut into small pieces, and put into a glass vessel filled about half full, upon which must be poured spirits of turpentine and oil of lavender, with a little gum mastic. When all is thoroughly dissolved, a clear liquid is formed, which should be carefully drawn off into a large-mouthed stoppered glass bottle, lest evaporation should arise and render the liquid too thick for use. Vitruvius advises the addition of a little pale linseed oil. This preparation should be kept in a warm place, and is quite ready for saturating the wall, or of mixing the colour for painting. The artist must next provide a portable grate for heating the surface of the wall to about 100°, then applying the liquid preparation of wax to the surface of the wall with large brushes, until the absorbing power ceases, shifting his heating apparatus to the next portion, and so on. A good white ground work is then to be painted in rather full body, mixed with the same preparation of wax; and when this grounding is sufficiently firm the picture may be painted. It is especially

worthy of notice that all the colours used in oil painting may be employed in encaustic. When the whole work is completed it should be coated with varnish, composed of wax mastic and liquid bitumen. When sufficiently dried the surface is heated again, and the whole sudorises together, the varnish coating the picture itself, the ground on which it is painted, and the first preparation on the wall, which forms on cooling a combined body of these substances. This work is luminous but not glossy, finely transparent although so solidly painted, and is a brilliant and almost imperishable work of art, which seems especially adapted for historical paintings and surface decoration, on either a large or small scale, as it does not confine the artist in the same manner as fresco, but allows him opportunity of retouching and shadowing freely. After the work has been left partly finished, without showing any disadvantage, it seems fitting for any work requiring the freest use of the pencil.

Damp or fire is the only enemy to encaustic; negligence, of course, will sometimes cause the destruction of the finest work of any kind. The paintings on the vaulted ceilings in the library of Siena were ruined by some working men who mixed mortar above them.

We append a description of the examples which were exhibited, illustrative of Mr. Pitman's paper:—

No.	Description.	Lent by
1	Woven tapestry, in excellent condition...	The Marquis of Salisbury.
2	Persian pattern carpet, of Axminster manufacture, coloured by W. Pitman	T. Hughes, Esq., M.P.
3	Parquet floor bordering ...	Messrs. Arrowsmith and Co.
4	Pattern of satin damask	Messrs. D. Walters & Sons.
5	Painted pilaster	Mr. Earle.
6	Satin hanging for wall panels	Messrs. Corbiere and Son.
7	Painted pilaster	Mr. Earle.
8	Imitations of old stamped leather pattern manufactured in paper ...	Messrs. Corbiere and Son.
9	Impressed gold pattern decorative panel	Messrs. W. Woollams & Co.
10	Imitation leather pattern, printed on paper	Messrs. Pitman & Cuthbertson, 30, Newgate-street.
11	Imitation leather panel, green and gold in paper	Messrs. W. Woollams & Son.
12	Lyons brocade, of the richest manufacture	Messrs. Corbiere and Son.
13	Painted pilaster...	Mr. Earle.
14	Pattern of satin damask	Messrs. D. Walters and Sons.
15	Painted flock paper, heraldic border, the lower part left as manufactured	Messrs. Scott and Cuthbertson, designed by W. Pitman.
16, 17 & 18	Patterns of old style of stencilling on coloured walls, at least 30 years old	Mr. Geo. Pitman, Bath.
19	Painted flock panel	Messrs. Scott and Cuthbertson.
20	Raised flock as printed ...	Messrs. Scott and Cuthbertson.
21	Examples of the best embossed painted and gilt leather, at least 200 years old. The piece representing St. Hubert and the boar, is a fine example ..	Mr. George, Dean St., Soho.
22	Imitations of leather embossed in thick paper ...	Messrs. Corbiere and Son.
23	French caricature paperhanging	Mr. Pearse.
24	Newest style of French embossed appliqué gold paper	Messrs. Corbiere and Son.
25	Various specimens of mediæval paperhangings...	Messrs. Pitman and Cuthbertson, designed by W. Pitman.
26	Specimen of old manufactured paperhanging, the 12 yard piece formed by pasting sheets together, each sheet stamped with the duty paid mark, about 45 years old	W. Pitman.

(*To be continued.*)

Historical MSS.—On Tuesday the Royal Commission on Historical Manuscripts issued their first report. As far as their inquiries have extended, very important and valuable materials have been brought to light, illustrating some of the least known periods in the history of Great Britain. About 180 persons and heads of institutions have expressed their willingness to co-operate with the commissioners, and amongst others, the Duke of Bedford has placed the calendar of his valuable collection at Woburn Abbey at their disposal.

ANCIENT FONT IN S. MICHAEL'S CHURCH, SOUTHAMPTON.

The font in this church is an ancient and curious specimen of workmanship of Norman date, but is not so well known as its antiquity and peculiarity claim for it. It resembles closely that in Winchester Cathedral called the "crux antiquariorem," which Mr. Britton ascribes to the time of Walkelyn, Bishop of Winchester, who died in 1097. The font of S. Michael's may be regarded as coeval with it. It consists of a square block of black marble supported on a central stem and four angle shafts, with a hemispherical basin in the centre. The top is ornamented with rudely-carved running foliage, while each side or face is divided into three circular compartments charged with rudely-carved figures in low relief emblematical of the Saint or Archangel Michael, who is spoken of by S. John as fighting against the Dragon and his host. This seems to be portrayed by the figure of an angel clothed in a long robe, the head having a nimbus, and with extended wings. Under the superintendence of Messrs. Guillaume and Parmenter, architects, this curious relic is, we are glad to learn, undergoing restoration. The four angle pillars (whose bases are still sunk, indicating the position and size of their shafts) have been replaced in Purbeck marble. The capitals of these consist of three broad leaves to each pillar, which are carved on the under side of the main body of the font at the corners. We are glad to find, through the liberality of a lady, that this restoration of the corner pillars is to be supplemented by a suitable font cover, and we hope to give a view of the font at an early date.

PARLIAMENTARY NOTES.

The Palace of Westminster. — Mr. Gregory, on Thursday, the 17th inst., asked the First Commissioner of Works whether he had intimated his intention of placing in the hands of his own department all the works of the Palace of Westminster which have hitherto been under the supervision of an architect; and, if so, whether he would inform the House of the name of the gentleman connected with the Office of Works to whom these professional duties were to be entrusted. Mr. Ayrton said the question was founded in some misconception. The arrangement to be made at the commencement of the present financial year would be that the Palace of Westminster would be placed, in the same manner as the other palaces of her Majesty in London, under the charge of Mr. Taylor, one of the assistant surveyors, whose office was not well described by the title, because it involved duties of considerable importance. The ordinary works were carried on under his immediate direction and guidance, and whenever any extraordinary works arose, they were executed by those whose peculiar capacity fitted them for the performance. For example, an artist was employed for painting, a sculptor for sculpture, and an architect for architectural work. Under the new system, Mr. Taylor would perform his functions under the supervision of another officer recently established in the Board of Works, and called the Director of Works. Her Majesty's Government had selected a gentleman of well-known high position, namely, Mr. Douglas Galton.

Public Buildings in the Metropolis.—Lord Elcho has given notice that, on going into committee of supply on Civil Service estimates, he would move a resolution which would be practically in accordance with the recommendation of the select committee of last year with reference to public buildings in the metropolis, and requiring the deposit of plans, elevations, models, and designs at the office of the Commissioner of Works, in the same manner as railway companies are now compelled to deposit in the Board of Trade, and to move for the necessary alteration of the standing orders.

Public Works for India.—Mr. Kinnaird on Friday asked the Under-Secretary of State for India whether the Viceroy had issued orders to stop further expenditure on public works, and if such was the case, whether the orders had been approved by the Home Government; and whether he would object to lay upon the table of the House a copy of the orders and of the despatches of Lord Mayo on the subject; also of the correspondence relating thereto. Mr. Grant Duff said that no such order had been approved by the Home Government of India, and none had been issued by the Viceroy. What happened was this. In last autumn the Government of India discovered that they had taken too sanguine a view of their immediate financial position. They found it necessary to make reductions in various branches of expenditure, and, amongst others, in that branch known as public works ordinary, embracing those public works which the Government of India paid for out of the annual public income. In order to reassure his hon. friend, he read an extract from a despatch from the Governor-General, showing that the works to be paid for out of the ordinary revenue would amount to £4,500,000, which, added to the sums proposed to be borrowed and for railway purposes, made a total of £10,000,000. He had no objection to lay the despatch on the table.

Metropolitan Buildings and Management.—On the motion of Sir W. Tite, leave was given to bring in a Bill to consolidate and amend the Buildings Acts relating to the metropolis, the formation of streets, and of sewers and drains in the metropolis, and for other purposes. The Bill was brought in and read a first time.

Regent's Park.—Mr. Plimsoll asked the Chief Commissioner of Works whether it was his intention to enclose the whole of the Regent's Park with a railing similar to that recently erected on the south-east corner of it; or whether he did not think that a less lofty and ponderous structure, which would not exclude the view of the park from the people passing on the exterior of the railing, would not be preferable. Mr. Ayrton said the part of the railing referred to by the hon. gentleman was erected under contract by his predecessor in office. Representations had since been made to him that the inhabitants would prefer a view of the park to a sight of the railing which was described by the hon. gentleman as a "lofty and ponderous structure." Under the circumstances he thought it right to reconsider the matter, and he hoped shortly to be able to re-enclose the park with a due regard to decency and order, and without annoying the inhabitants in the neighbourhood.

The New National Gallery.—In the House of Lords, on Monday, Viscount Hardinge moved for papers, of which he had given notice, namely, "That there be laid before this house copies of correspondence between the Office of Works and the architect of the new National Gallery, respecting the designs for the new building." Earl Granville said the question lay entirely with the trustees, but he need hardly say that it would be inconvenient to produce correspondence not yet finished. The subject was under consideration, and when any conclusion was arrived at he would communicate it to their lordships. Lord Redesdale complained of the manner in which objects of art were now distributed in various localities which ought to be in the gallery, and hoped Government would push forward the work at once. Earl Granville assured his noble friend that every exertion would be used for that purpose. The Earl of Carnarvon wished to know when the correspondence would be produced or laid on their lordships' table. The Earl of Kimberley: As soon as it is finished.

Gas and Water Bills.—In the House of Commons, the Chester Gas Bill, the Mansfield Water Bill, the Newport (Isle of Wight) Gas Bill, and the Runcorn, Weston, and Halton Water Bill, all of which had come from the Lords, were read a second time, and ordered to be committed.

Opening of Museums and Galleries at Night.—Mr. W. Allen postponed his motion on this subject till the 5th of April.

The Control Department and the Royal Engineers.—Mr. James White asked the Secretary of State for War what duties formerly carried on by the departments at present placed under the Control system were now performed by the Royal Engineers; and, if it be the case that those duties were satisfactorily performed and have entailed no increase in the superintending staff of that department, what reduction had been made, in consequence of those diminished duties, in the number of officials under the consolidated system of the new Control Department. Mr. Cardwell said it was proposed to give back to the department the custody of the barracks and recruits.

The Central Hall of the Houses of Parliament.—Mr. A. Guest asked the Chief Commissioner of Works whether he intended to make provision in the estimates for completing the decoration of the central hall; and, if not, his reasons for not so doing. Mr. Ayrton re-

plied that until the estimates were prepared and laid on the table it was not usual to ask what would be the cost of particular works. He had no authority to say what they had cost, but when the estimates were prepared the hon. member would be able to have all the information he desired. In reply to a further question from Colonel Sykes, the hon. gentleman stated that for the illumination of the mosaic picture in the central hall a new light would be necessary, and that would involve a new window and other works.

Deputations.—Mr. Macfie asked the Chief Commissioner of Works whether the rooms in which members of the Government receive large deputations had been or would be examined, with a view to ascertain whether the floors were sufficiently strong to bear the great number of persons who were occasionally crowded thereupon. Mr. Ayrton believed that the floors of the rooms in which members of the Government received deputations had not been very carefully examined at any recent period, and he was bound to say that some of the older buildings were built in a somewhat unsatisfactory manner, the floors not being calculated to bear the large crowds which occasionally waited on the ministers, not so much as a deputation, as by way of demonstration. The floors were, however, quite strong enough to bear the weight of any reasonable number of gentlemen who might deem it necessary to wait on a minister for the purpose of expressing their opinions on a public question. As a matter of safety hon. members would do well to keep deputations within reasonable limits. With regard to the new buildings, however, no matter how great the crowd might be which visited them, either to the inconvenience of the deputations or the ministers, the buildings themselves would not be likely to suffer any injury.

ARCHITECTURAL SOCIETY.

Royal Institute of Architects of Ireland.—The usual monthly meeting of the above Institute was held on Thursday, the 17th inst., at No. 212, Great Brunswick-street, Dublin, James H. Owen, M.A., Esq., in the chair. The minutes of the last meeting having been read and confirmed, the chairman stated that Mr. T. Collot had been the successful competitor for the Fitzgerald bronze medal. The chairman congratulated Mr. Collot on his labours in producing the excellent drawing then before them. Their profession, like all others, was of course, built on its junior members. He hoped all those members would do better than they the seniors had done. Mr. Collot was then about to read for them a paper on Grey Abbey, County Down, and although he (the chairman) was not then aware of its contents, he was convinced it would display the same intelligence as had the drawings of the Abbey then before the meeting. He would unavoidably have to postpone the formality of placing the medal in Mr. Collot's possession, as it had to be engraved, but trusting the gentleman would imagine that mere formality completed, they were ready to hear Mr. Collot's paper read. Mr. Collot then proceeded to read an essay on Grey Abbey, which displayed great intelligence and much research. Mr. Collot having concluded, Mr. H. Brien moved that the thanks of the Institute be passed to Mr. Collot not only for his clever drawings, but the paper which he had just then read. The motion was seconded by Mr. C. Geoghegan, and was unanimously passed. Mr. Park Neville, C.E., having been moved to the second chair, Mr. Owen read a paper on the late Doolin and Dixon case. The paper which treated of the entire case was highly interesting, and at its conclusion the meeting manifested their approbation of it by applause. A vote of thanks having been passed to Mr. Owen, Messrs. Robinson, Otway, and Butler were unanimously elected as Associates of the Institute, and Mr. G. Booth as a non-professional associate.

SCHOOL OF ART.

Dorchester School of Art.—The pupils of the Dorchester School of Art underwent their annual examination on Friday week. The school being in connection with the Science and Art Department, South Kensington, the usual rules of the Department were observed. Seventeen pupils were examined in freehand, eight in geometry, seventeen in model drawing, and six in perspective. The papers have been forwarded to the Science and Art Department by the hon. sec.

Building Intelligence.

CHURCHES AND CHAPELS.

Building and Enlarging of Churches and Chapels.—The Incorporated Society for Promoting the Enlargement, Building, and Repairing of Churches and Chapels held its usual monthly meeting on Monday last, at the Society's house, 7, Whitehall, the Earl of Romney in the chair. Grants of money were made in aid of the following objects:—Building new churches at Darlington, S. Paul, and Ford End, in the parish of Great Waltham, Essex; rebuilding the churches at Speldhurst, near Tunbridge Wells, and Withington, near Shrewsbury; enlarging or otherwise increasing the accommodation in the churches at Bathwick, S. John's, Somerset; Clerkenwell, S. Philip's, London; Odcombe, near Ilminster, Somerset; Whitfield, near Brackley, Northampton; Worle, near Weston-super-Mare, Somerset; and Yatton, Somerset. Under very urgent circumstances, the grant formerly made towards enlarging and restoring the church at Marlborough, near Kingsbridge, Devon, was increased. Grants were also made from the School, Church, and Mission House Fund towards building mission churches at Mynyddislwyn, near Newport, Monmouth, and Pensnett, near Dudley. The society likewise accepted the trust of money as repair funds for the new churches at Talbot village, Dorset; and Hounsdown, near Southampton. This meeting was the last in the society's financial year, and grants amounting to £7630 (a sum larger than has been received in the same time) have been made towards the erection of 39 new churches, the rebuilding of 20, and the enlarging or otherwise increasing the accommodation in 86 other churches. The committee have also assisted in providing eight school churches and mission-houses.

Folkestone.—The lowest contract, Messrs. Bowley's, for £1127, is understood to have been accepted for the restoration of S. Peter's Church, Folkestone. The whole works will be carried out from plans prepared by Mr. S. Slingsby Stallwood, architect, of Folkestone, after Easter. The principal additions will consist of a new north aisle and extension of north transept, sacristy, and sanctuary; increasing the height of church by raising the roof 5 feet and lowering the whole of the floors; reducing in height the present sittings throughout, and putting at the intersection of transept with nave and sanctuary roofs an oak octagonal *flèche*, finished with leaded circular spire, and arranged for affording thorough ventilation to the church, the want of which is very much felt. A porch has been provided for at the west end; but this it is proposed to leave down for the present.

North Shields.—A New Presbyterian church, situated in Collingwood-street, North Shields, was opened last week. It is constructed of iron, is 66 feet in length, and 27 in breadth, and affords accommodation for fully 300 worshippers. It is fronted by a porch, over which rises a neat trefoil window, with deep stained glass; a neat spire, 20 feet high, surmounts the whole. This is the first iron church built in North Shields. It has been erected by Mr. C. Kent, Euston-road, London.

Romaldkirk.—The restoration of Romaldkirk Church has just been completed, under the direction of Mr. Hoswell, architect, of North Shields. This church is the only one in England dedicated to S. Romald the Hermit. It is a large, well-proportioned edifice, Early English and Late Decorated in style.

Wibsey.—The new Wesleyan chapel at Wibsey, which is in course of erection in the Gothic style, from the designs of Messrs. Andrews, Son, and Pepper, architects, Bradford, is approaching completion, and is expected to be opened in May next. The building has been roofed in. Space will be left for galleries, but it is not intended to put these in at the outset. The cost will be about £2400, inclusive of the site.

BUILDINGS.

Hoxton.—The new Variety Theatre, Pitfield-street, Hoxton, briefly noticed in our last, has been erected from plans prepared by Mr. C. J. Phipps, of 26, Mecklenburg-square, the architect of the Gaiety, Queen's, and Vaudeville (shortly to be opened) theatres; and the decorations and drop have been designed and painted by Mr. G. Gordon, of the Queen's and Gaiety theatres.

Rome.—A Roman correspondent writes announcing the completion of the rebuilding of the Scotch College, in the Quattro Fontane-street. The foundations had to be carried to a depth of 60 feet, on account of the instability of the *debris* of antiquity which covered the site. The architect was the late lamented Commendatore Luigi Poletti. The *portone* is left without cornice or any salient ornament, other than a figure of S. Andrew, in high relief, committed by Poletti to the chisel of his friend, the late eminent sculptor, Tenerani.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

Received.—P. E. M.—C. B. A.—T. W. C.—E. A. L.—W. H. and J. W.—C. G.—James Lamb.—L. & Co.—J. L. W.—P. and R.—W. H. C.—W. B.—E. A. L.—J. B. B.—J. J. Elliott.

C. H. C. (Birmingham) asks us the circulation of a London professional paper. We can only tell him that it has not the eighth part of the circulation it professes to have. Let C. H. C. inquire at any of the principal newsagents of Birmingham, and ascertain for himself.

J. C. Williams.—Your letter is wide of the mark.

Patrick.—Your sketch will most likely appear, but we cannot exactly say when.

W. W. M. informs us that the work of restoring Swine Church, referred to in our last, will also be under the superintendence of Mr. Christian, of London.

R. T. Andrews.—The question, as you have put it, is not intelligible.

Correspondence.

DR. ZERFFI AND THE HISTORICAL DEVELOPMENT OF ART.

To the Editor of The Building News.

Sir,—The honour of "having been for many years engaged in the service of the triad" has so weighed down your correspondent "P. E. M." that all but the three capital letters of his Christian and surname seem to have been crushed out.

Had this professor favoured the public, as in the case of Dr. Zerffi, with his name and position, we outside public should have been impressed with his authority, and not ventured a remark. As it is I am bold enough, as one of the small particles tending to make the aggregate public, to express my views—although I feel "P. E. M." may justly continue to designate us outsiders as "blind" and engaged in "leading the blind" whenever we attempt an observation upon matters connected with "his triad." But how does the matter stand?

Dr. Zerffi is reported by you to have said "The religion and art of a country are usually founded on its natural scenery." To this proposition "P. E. M." does not venture a reply more gracious than that of saying in his first letter that Dr. Zerffi's lecture was "a tissue of falsehood and nonsense."

Yet withal the proposition is an historical truism—acknowledged alike by the German Curtius, and Mommsen, as the English Grote, Buckle, Baring, Gould, and every writer pretending to write history.

Challenged by your reporter and others with this omission, "P. E. M." admits it by making no reply in his second letter.

If he knows anything of philology he must be aware how physical and natural appearances produced epithets—how epithets begat mythology—and mythology an idolatry or object of worship; and how, with an element higher than man once created, the human mind came to elevate the material and physical productions of man, and finally strove to raise man himself to the level of the object he worshipped.

The high physical training in Greece, the abandonment of every idea in the Greek citizen but that of producing the finest soldier—material element for the state—coupled with the desire to raise the finest specimens to the level of the gods, acted and reacted by the passing of social laws and otherwise, until the Greek had his beautiful development of human form, as much as modern Englishmen have in the animal form of the race-horse.

Dr. Zerffi illustrated his general proposition by calling in aid first Indian physical geography, and then is reported to have said in reference to his second illustration—Greece, "Let us consider, as in Indian art, the nature of the country."

In alluding to this he mentioned the enormous length of sea-coast in reference to the superficial area, and its consequent influence on the population and philosophy, and he made use of the truism that the *sea* was "the origin of many of our grandest thoughts and similes."

Curtius speaks of this truism thus: "From three sides the sea penetrates into all parts of the country; and while it accustoms men's eyes to greater acuteness, and their minds to higher enterprise, it never ceases to excite their fancy for the sea, which, in regions where no ice binds it during the whole course of the year, effects an incomparably closer union between the lands than is the case with the inhospitable inland seas of the north." "Thus (he adds) the special advantages of the land of Greece consist in the measure of its natural properties."

Art in Greece (as in fact all art is) was the product of the mind, and that mind was influenced largely by the physical features of the country.

Your correspondent "P. E. M.," in his second letter, apparently misreads Dr. Zerffi, and alleges "Dr. Zerffi starts a fanciful hypothesis that Greek art owes its excellence to the influence of the sea"—forgetting apparently that it was only in illustrating the influence of the physical features that Dr. Zerffi alluded to *one* only of the most remarkable of those features—its extent of sea coast, and that the sea was the origin of *many* of our grandest thoughts and similes, and not the origin of the Greek art. He by no means confined himself to the physical element of the sea being the only influence.

"P. E. M." tells us that other and more demonstrable causes than those he attributes to Dr. Zerffi as his basis gave the excellence to Greek art—viz., "The constant demand under a gross pantheistic religion for figures of the gods."

In answer, I dare not venture a long observation. I will quote a professor, but that an eminent one, M. Taine, who writes, "Greece so thoroughly wrought out its conception of the beautiful human animal, as to make an animal of it, and in order to glorify it on earth, the Greeks made a divinity of it in heaven.

Destroy the Greek mind, the Greek freedom, the Greek intellect—merge all in the materialism and physical superiority of Rome, and with it Greek art ceases. But with the destruction of the art, what P. E. M. calls the gross pantheistic religion of the Greek was not destroyed, the Greek religion lived on through the Roman period, but yet produced no real and true art of the excellence of Greece.

Let us now turn to another exception taken by "P. E. M." as to Dr. Zerffi's statement that "the arrest of art is despotism either of religion or of rulers," and the illustration he cites of the Jews, who "were forbidden by law to carve or engrave," and who "entertained a horror of building, from their bondage in Egypt, and their compulsory labour there," so that that nation possessed no art whatever."

This is designated by the professor of the "triad" as "foolish and empty assertions." At the same time he admits the ancient Jews did not certainly distinguish themselves in art as greatly as other nations did, and he gravely asserts that this was because architecture, sculpture, and painting in other nations were all developed and brought to excellence in the service of religion.

"P. E. M." assumes that religion absorbed, used, and developed these arts, not that they developed religion; but if this be true, how comes it that the highest religion of the old world, the most intellectual development, one that kept society together in the longest continuous period—in short, the highest system of religion, the Jewish—did not absorb, use, and develope these arts, and possessing a higher mental standard than the surrounding heathenism or Zoroastinism, produce a higher class of art than elsewhere? The Christian religion, in later times, so long as it was the form in which philosophy and mental efforts gave forth their utterances, could absorb, use, and develope these arts in the rearing of the most splendid and impressive buildings the world has ever known. Jewish religion, unfettered, could not have stopped a similar development, except by some stringent law imposed by priest, such as that cited by Dr. Zerffi, which stunted the whole growth of Jewish art. For where are its civil palaces, its regal courtyards, as at Nineveh—palaces and yards far removed from religious purposes, and wholly unconnected with them?

What single remain exists of this high Jewish art, which "P. E. M." speaks of? Where is it to be found?

Egypt leaves to us its monuments, Nineveh its civil palaces, Greece its temples and statuary, Rome the remains of its physical power in its amphitheatres, not only in its capital but in its outlying provinces of Verona, Arles, Nimes, Pola, and its civilisation in gigantic aqueducts in its remotest colonies. But where do we find one single civil or religious remain of Jewish art? It is all swept away, whilst savages have left behind gigantic sculpture, as at Easter Island, and huge tumuli, as in the valley of the Mississippi.

It is idle to cite the marvellousness of Solomon's temple as a specimen. The false excitement of both Christian and Mahomedan in the middle ages as to its alleged glories produced fanciful stories, which descended, and to this day are repeated in our nurseries and Sunday-schools.

Beyond its being accepted as a copy of the wooden tabernacle, ornamented with layers of gold, we have nothing on which to hazard an opinion. The best authorities only consider it to have been a metal encrustated style, made splendid by precious metals, and not sculpture.

Succeeded by the temple of Zerubbabel and that of Ezekiel, the same glory is not even mythically attached to these later temples, and there is but little doubt that many of the beauties of the "Temple of Herod" reared under Roman influence, and of which there is something like an authentic account, were in later generations attributed by the Jews, the enemies of the Roman, to the "Temple of Solomon," a temple claimed to have been erected under and by the Jew alone.

If "P. E. M." were to study for a short time a little history, he would do well before speaking of the "triad," the product of that same intellectual element which is in part portrayed by history, and which, with the "triad," tends to give a true representation of the philosophy and feeling of a period.

CHARLES HARRISON.

March, 1870.

SIR,—My remarks on Dr. Zerffi's opinions refer solely to the report of his lectures which appeared in your journal. The Doctor pretends to abide by that report, but in detail he tries to shift his ground.

His statement that though there were Jew picture dealers, yet that *never* were there Jew painters, I meet with a broad denial, and produce a list of such artists. He then tries to wriggle back to the East and antiquity, and says my answer does not apply, but your ingenuous readers will see that it does apply, for it is evident by the allusion to the *dealers* that modern times is meant. And, moreover, it goes to show that the Law does not prevent Jews painting pictures, and that they have the mental power to do so, and that in an eminent degree. In similar spirit he makes a great pretence of informing me that "Doris lies north of Athens," as though this was a point in dispute, blinking the fact that I had asserted that the south was the birthplace of the Doric order.

In the face of the passage in II. Kings, which I quoted, he says not one single Jew took part in the building of the Temple. Dr. Adam Clark, well known both as antiquary and a Biblical commentator, says this mention of 30,000 evidently does refer to Jews, and that probably the 70,000 named strangers were occupied in the harder and more menial descriptions of work.

My expression, "what Protestants term the second Commandment" was induced by the fact of Roman Catholics not dividing the Decalogue in the same manner as Protestants. For many of your readers, to say simply the second Commandment would not be sufficiently definite.

With regard to the meaning of the law, that it is not prohibitory *per se*, I argue from the example of the Temple, an argument that no amount of rabbinical reasoning can weaken, and Solomon's private works, at a time when he stood high in Divine favour, are of scarcely less authority. Josephus, indeed, does affect to impugn the King's acts, but, as Dr. Whiston clearly explains, Josephus does it without justification.

In modern practice, representations of natural objects are still used in Jewish places of worship, frequently flowers. In one case in London, figures of lions holding the *tables of the Law!* and in Rome human figures are amongst the ornaments: but much more than this, I have the authority of the learned and estimable Dr. Adler, Chief Rabbi of the United Congregation of the British Empire. His statement is, "that according to Jewish law, painting is permitted, and sculpture is, in certain cases only, forbidden." I think, Sir, this, from the highest authority of the day, is conclusive. I enclose the Rev. Doctor's statement in corroboration of what I say, but not for publication.

So far from agreeing with Dr. Zerffi in supposing their experiences in Egypt would make the Jews hate building, I think, as regards all the arts, useful and ornamental, the sojourn in Egypt was most valuable to them, they no doubt acquiring a vast amount of knowledge from what was then the highest civilisation existing. That valuable art knowledge was so acquired we learn by the ready way in which the brazen calf and the serpent were made, and by the labours of Bezaleel and Aholiab, Exodus xxxviii., 22, 23. Solomon had quite a passion for building. II., Chronicles viii., 1—5. Hiram I claim as a Jew, as Josephus says he was by birth of the tribe of Napthali, on the mother's side, but his father was Ur, of the stock of the Israelites, and though a man of Tyre, he might be a Jew.

From its proximity to their own country, the nationality and language having the same origin, and the king being, if not a Jew proselyte, at least favourable to the true religion, it is probable there were many Jews resident at Tyre.

The Doctor asks your readers whether he did not make the same statement as me in reference to Jewish architecture, "only in somewhat different words." I beg to remind your readers that the Doctor's words are that the "Jews have no art." I say they had.

In preference to the Doctor's statement respecting the Jews being a mixture of black, yellow, and white races, I prefer the Scripture testimony, which shows an uninterrupted and unmixed descent from Shem.

The latest of the Doctor's dilletante dogmas is that the Greek "Doric and Ionic styles were melted into one, forming the Attic style." Need I say, Sir, that nothing of the kind ever took place? The *Romans* had an Attic base, and a so-called Attic order in general use for the top of buildings, but these did not constitute a *style*, but were used indiscriminately in all the styles. Is this what the Doctor was running his head against? When people set up as teachers without practical knowledge, but guided only by indiscriminate reading and theory, they must necessarily halt and blunder.

P. E. M.

ADVERTISING ARCHITECTS.

SIR,—The enclosed circular having just been placed in my hands I beg to forward it to you, as I think it is a "rarity" that the architectural world should see, that they may know with whom we have to compete in Hull.

I also send you an extract from a local paper of Saturday's date, in which you will see that the author hopes to catch custom by advertising his gratuitous services.

By devoting a spare corner of your next to the exposure of these little devices you will much oblige an old subscriber.—I am, &c.,

SAML. MUSGRAVE.

5, County-buildings, Hull, March 21.

[The circular referred to was just such an one as any grocer or tailor would issue. The following is extracted from the advertisement columns of a local paper:—

"NOTICE.—Charitable Institutions, Churches Chapels, Schools.—An architect in Hull will prepare plans and specifications for the above gratuitously.—Plans prepared for houses. Works superintended on reasonable terms.—Address, 'Argus,' *Hull News*."—ED. B. N.]

THE MOTE HOUSE, IGHTHAM.

SIR,—Permit me to remark that Ightham is too large to be correctly defined as an island, merely from the circumstance of the Mote House having been surrounded with water, as was frequently the case of old, like the residence of that sad lady, who so persistently asserted that she was 'a weary, she would that she were dead.

Ightham, in Kent, is said to have derived its name from a union of *eight hamlets* into one township. It was once a market town, and I find enumerated Borough-green, Oldbury, Redwell, and Toyhatch, as well as the Mote-house, forming five only out of the eight hams which it boasted of old.—I am, &c.,

A. HALL.

TREES OBSTRUCTING HIGHWAY.—The plaintiff in the case of Turner v. the Ringwood Highway Board was possessed of lands on each side of a highway through Leybrook-common, the land being covered with valuable fir trees. The Highway Board cut down some of these trees, on the plea that they were an obstruction to the highway. It was held that, *primâ facie*, the Board had a right to do so, and an injunction to restrain them was refused by Vice-Chancellor James, but without prejudice to the right of action (if any) which the plaintiff might have in respect to the sale or removal for the purposes of sale of trees in question.

Intercommunication.

QUESTIONS.

[1810.]—BREAKING WEIGHT OF CAST-IRON BEAM—Could any of your numerous readers inform me how to calculate the breaking weight of a cast iron beam thus:—being 14ft. between supports?—F. B. PUPIL.



[1811.]—SIZE OF PANEL.—Will some of your readers inform me what is the proper method generally adopted for reducing a panel of any given dimensions to half its size and retain the same proportion?—J. T. M.

[1812.]—EBONISING MAHOGANY.—Will some of your correspondents have the goodness to inform me the simplest manner of ebonising mahogany and half polishing it afterwards on small surfaces?—FIVE POINTS.

[1813.]—CONSTANTS OF LABOUR.—Will any of your numerous readers kindly inform me of a simple but correct method of finding the value of labour in the several branches connected with building, as set forth by Hirst in his handbook under the head of "Constants of Labour?" He there states that the time during each day which the workman is assumed to be at work is 10 hours. As an example, under the head of "Bricklayer's Work":—

	Days of a bricklayer and labourer.
Brickwork in mortar to walls exclusive of face work } per rod . .	3·500

Bricklayer 10 hours at 8l. = 6s. 8d.
Labourer „ 4½l. = 3s. 9d. = 10s. 5d.

The question is, in what way is the constant of labour, as above, and the rate of wages amalgamated, in order to ascertain the value, labour only, of a rod of brickwork? Again, under the head of "Mason's Work":—

	Time of mason per foot super, Portland.
Plain work tooled	130

Mason 10 hours at 8d. = 6s. 8d.
Query as before, value per foot super of labour only.—QUERICUS.

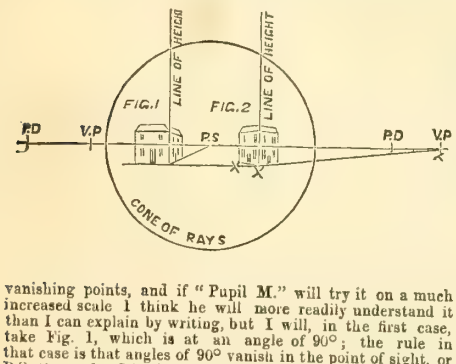
[1814.]—HEDGES AND DITCHES.—Can you, through your Intercommunication column, help me in the following matter?—My neighbour has a hedge and ditch abutting close on the rear of my cottage, and he has filled up the ditch to about 3ft. above the ground floor. Has he a right to do this, and how far can he claim as the width of a ditch? Doubtless some of your numerous readers can speak from experience on this matter.—FAIR LINE.

[1815.]—PATENT FUEL.—Would any of your readers inform me the best kind of machine, and cheapest mode of cementing small dust, or slack coal, into blocks for burning in engines, instead of lump coal, and were I could see this kind of work in operation?—A SUBSCRIBER.

[1816.]—RIGHT OF LIGHT.—Will an agreement given by the owner of the light to the party whose ground it overlooks be a sufficient legal security against the said owner, his heirs, &c., claiming a right after 20 years?—INQUIRER.

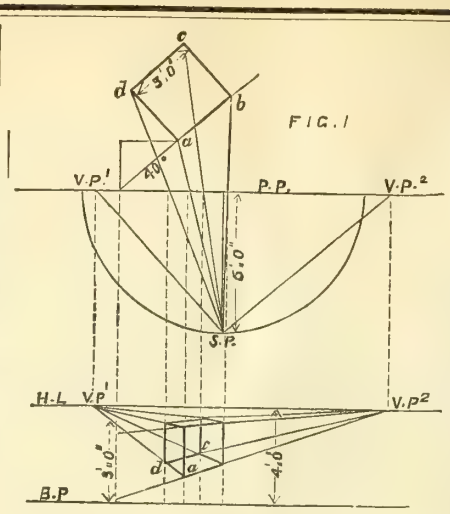
REPLIES.

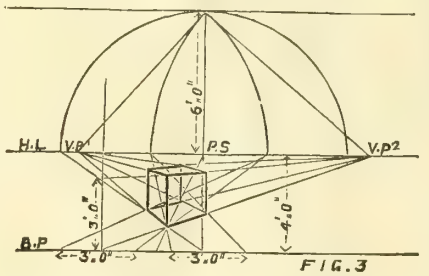
[1797.]—DIMINISHING POINTS.—I have enclosed a diagram showing two pictures in perspective, and also their



vanishing points, and if "Pupil M." will try it on a much increased scale I think he will more readily understand it than I can explain by writing, but I will, in the first case, take Fig. 1, which is at an angle of 90°; the rule in that case is that angles of 90° vanish in the point of sight, or P S, those of 45° in the point of distance, or P D. The rule to get the points P, D, P, D, which are always requisite in perspective of this kind, is to join the cone of rays which must contain the picture, then by taking the diameter, and with A as centre cut the horizontal line, which will give the points P, D, P, D, required. In fig. 2 the angles are taken at will, and when the first plan is placed in perspective as X X X if the lines are continued until they cut the horizontal line at V P, V P, will give the vanishing points for the rest of the picture. I imagine "Pupil M." knows the rule of perspective, and I hope I have explained his question, for I fear it is somewhat difficult to obtain too much of your space to explain more definitely the rule, as your Intercommunication column is, as it ought to be, very largely patronised.—J. B.

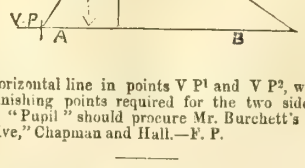
[1797.]—DIMINISHING POINTS.—Perhaps "Pupil M." would better understand the rule if I were to propose a simple problem—say a cube, and find its vanishing points geometrically. (Fig. 1.) Let *a, b, c, d*, represent the plan of a cube 3ft. side, and one side at an angle of 40° with the picture plane P P, and nearest angle 2ft. from it, height of the eye 4ft., and 6ft. from P P, and 2ft. to the left of the nearest





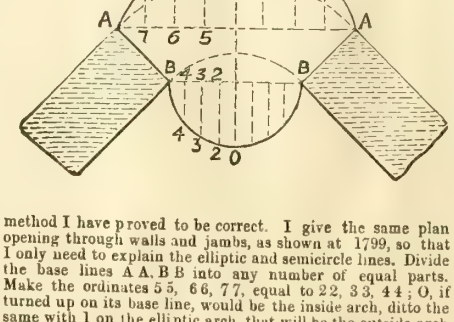
angle *a* of the cube, ⅛ scale. Place the position of the P P and station point S P as above, then draw the line S P, V P¹ from the S P parallel to *a d*, and where it intersects the P P, viz., V P¹ will be the vanishing point for all lines parallel to *a d*, then draw S P, V P² parallel to the other side in like manner, and V P² will be the vanishing point for the side *a b*, and all lines parallel to it. Fig. 2 represents the cube as it would appear when viewed under the above conditions with all the working lines. Fig. 3 is the same cube showing the method for finding the vanishing points in lineal perspective.—GIL BLAS.

[1797.]—DIMINISHING POINTS.—Diminishing points, or rather vanishing points, are regulated by the angles at which the building stands. Let us suppose a building is 20ft. distant from us. Then set up 20ft. from horizontal line A B, at which point C construct the plan of the nearest angle of the building V P², produce the lines C D, C D¹ till they inter-



sect the horizontal line in points V P¹ and V P², which will be the vanishing points required for the two sides of the building. "Pupil" should procure Mr. Burchett's book on "Perspective," Chapman and Hall.—F. P.

[1799.]—SOFFIT OF ARCH.—"Inquirer" wishes to know the same, I think, as "Young Stonemason" and "Rochdale." The annexed sketch, I hope, will give some information, which



method I have proved to be correct. I give the same plan opening through walls and jambs, as shown at 1799, so that I only need to explain the elliptic and semicircle lines. Divide the base lines A A, B B into any number of equal parts. Make the ordinates 5 5, 6 6, 7 7, equal to 2 2, 3 3, 4 4; O, if turned up on its base line, would be the inside arch, ditto the same with 1 on the elliptic arch, that will be the outside arch to make a level ceiling of soffit. If "Inquirer" wants to get out centre out, and he cannot do it with the method sketched, I shall explain further.—JOHN HUDSON, joiner, &c., Sunderland.

[1783.]—SHOP STOVES.—The youth who so ably described the usual process of smoking and scorching glue (without any apparatus) might have spent his penny better in writing for information on other subjects, instead of attempting to answer questions he does not understand. I imagine that a trough (with spaces in the top for the usual double pot to stand in) the width of fireplace set far enough from the back to allow the flame, &c., to ascend behind it, and supplied with a feed cistern, would answer. Perhaps some correspondent may have seen a contrivance of this kind. I have not any available steam, such as is generally used to keep the glue hot in large manufactories.—INQUIRER.

STAINED GLASS.

LEEDS.—An east window, by Messrs. Ward and Hughes, of London, has just been completed and fixed in the church of S. John the Evangelist, Leeds. The subjects depicted are, in the upper half of the window, "Christ in Glory," and in the lower half "The Crucifixion." The remainder of the window contains representations of various Saints of Old Testament and Christian times.

BARNARD CASTLE.—A stained glass window, in memory of the Rev. G. Dugard, is about to be fitted up in the parish church. It will be executed by Mr. Baguley, of Pilgrim-street, Newcastle-on-Tyne.

STATUES, MEMORIALS, &c.

HACKNEY.—The friends and admirers of the late Rev. R. B Aspland, M.A., minister of the Unitarian chapel at Hackney-have erected a memorial in white Carrara marble, containing a medallion portrait, in that building. The work was executed by Mr. Gaffin, sculptor, of Regent-street.

MEMORIAL BRASS.—A monumental brass has been placed in the ante-chapel of Exeter College, Oxford, in memory of a commoner of the college who was accidentally shot by a fellow student. It bears a Latin inscription, and was executed by Messrs. Hart, Son, Peard, and Co.

WATER SUPPLY AND SANITARY MATTERS.

THE SANITARY STATE OF EASTBOURNE.—A report on the sanitary state of Eastbourne has been made to the Privy Council by Dr. Thorne Thorne. There appears to be most undeniable evidence that the main causes of typhoid fever in Eastbourne are the use of impure water and the inefficient ventilation of the main drains. In some instances water for domestic purposes is drawn from wells in close contiguity to cesspools. The system of ventilating the main sewers through charcoal, though in some respects good, is, as applied at Eastbourne, worse than useless, on account of its entirely stopping the exit of the sewer gas, which has been thereby forced into the houses. What really seems to be required for the sanitary well-being of the town are a proper ventilation of the sewers and house drains, an adequate supply of pure water, and the disconnection of the direct communication between water supply cisterns and the sewers by means of waste pipes.

NEW DISINFECTING APPARATUS.—Mr. George Fraser, of the firm of John Fraser and Sons, exhibited and explained at a recent meeting of the Medical Officers of Health Association a new apparatus for which he has recently obtained a patent. The object is to supply a ready means of disinfecting all clothing, bedding, &c., that may have been used by persons suffering from fever or other infectious disease. If such apparatus were erected in all populous districts, it is highly probable that the spread of many diseases would be considerably checked. The apparatus and its working may be thus briefly described:—A brick oven or chamber occupying a space 8ft. square is erected, in the lower portion of which is a covered furnace and flue capable of raising the internal atmosphere to the required temperature, the front being enclosed with a sliding door. A closed truck or carriage is provided with shelves, racks, and doors, and it is intended to collect the clothing in these carriages from the infected houses and convey it to the chamber. The front door is then opened and the truck placed inside, the fire lighted, and the process of disinfection takes place, sulphur or other fumes being used. When the process is completed the truck is again taken to the house and the articles removed. The chief points in this patent are:—1. The whole of the vapours given off during the disinfection are, by a peculiar arrangement of flues, made to pass through the furnace and are thus consumed. 2. The clothing is not removed from the truck until returned to the owner. 3. The carriage which conveys the clothing and returns the same to the house from which it was taken is itself disinfected on each occasion with the clothing, &c. 4. The apparatus is not expensive.

LAND AND BUILDING SOCIETIES.

DEWSBURY AND WEST RIDING PERMANENT BUILDING SOCIETY.—The shareholders in this association held their annual meeting last week. Mr. W. Hemingway, secretary, submitted the report, which showed that the income from subscriptions during the year had been £5052 12s. 7d., and the income £8957 9s. 5d. After paying interest at the rate of 4½ per cent. to each shareholder, a bonus of 2 per cent. on the amount of each share was provided for out of the profits. The report was adopted.

LONDON LABOURERS' DWELLINGS SOCIETY (LIMITED).—It appears by the seventeenth half-yearly report that this society is in a very flourishing condition. The capital of the society now amounts to £42,200, and several blocks of buildings have been added to its estates.

LEGAL.

CLAIM BY AN ARCHITECT.—At the Gateshead County Court, last week, the case of Lithgo v. Davidson was heard. The claim was for £58 7s. 9d., but the £8 odd was discarded, as only £50 could be recovered in the County Court. In February, 1868, the defendant, a miller in Gateshead, engaged the plaintiff, an architect in practice at Darlington, to make and draw up plans for the rebuilding of his flour mills. A set of plans, sections, elevations and tracings was made, and tenders invited, but the plans were not car-

ried out in consequence of several objections made to them. The plaintiff charged the travelling expenses which he had incurred in preparing these plans. He drew up a second set of plans, upon which the mills were erected. He was entitled to charge 5 per cent. upon the amount of the contract, but he had only charged 2½ per cent. No terms were mentioned when he was engaged, and he had a right to charge 5 per cent. Evidence was given to this effect, and a number of letters were read to show that the defendant had never disputed the account sent in until recently. His Honour recorded a verdict in favour of the plaintiff for £35.

Our Office Table.

DINNER OF THE LOCKSMITHS EMPLOYED AT MESSRS. MILNER AND SON'S SAFE WORKS.—On Saturday afternoon last a dinner of the locksmiths employed at Messrs. Milner and Son's, Phœnix Safe Works, took place at the Phœnix Inn, Smithdown-lane, Liverpool. The locksmiths' department has only recently been established in connection with the works, and the men, assisted by their employers, took this opportunity of celebrating the event. The attendance numbered about 50, and included, in addition to the locksmiths, many of the other employés. Mr. William Owens occupied the chair, and Mr. G. Bolton (manager of the locksmiths' department) the vice chair. After the customary loyal toasts had been drunk, the Vice-Chairman proposed "The Health of Mr. Milner," and having referred to the recent introduction of the locksmiths' department into the works, and expressed his conviction that the other employés would find the locksmiths at all times ready to co-operate with them in the most cordial manner, he alluded to the past success of Mr. Milner's business, which he was confident would also be successfully conducted in the future. He pointed out the advantage the works would derive from the addition of this department. In conclusion, he expressed their best wishes for Mr. Milner's future health and happiness. Mr. Hughes proposed the health of Mr. and Mrs. D. Ratcliffe and family; and afterwards the chairman proposed that of Mr. Hulme, the surgeon to the works. Mr. Hulme, in responding, alluded to the kindness of Mr. Milner in having for many years past provided medical advice for the men gratuitously. After several other toasts the party separated.

THE STEAM ROAD ROLLER IN MAIDSTONE.—At a meeting of the Maidstone Local Board, on Wednesday week, it was resolved to purchase a steam road roller, at a cost of £580. The machine had previously been employed in consolidating the road surfaces of the town, and, according to a report made by Mr. Buckham, the surveyor to the Board, the use of the machine materially improved the stability of the roads, and saved at least 6 per cent. of the materials required for repairs. As the seconder of the resolution to purchase the roller observed, every improving town will sooner or later see the necessity of adopting a similar course. We may state that Mr. Randall, a resident in the town, contributed £100 towards the cost of the roller.

PROPOSED DOCKS AND HARBOUR OF REFUGE AT DEAL.—It is proposed to construct new docks and a harbour of refuge near the ruins of Sandown Castle. Nature has, it is said, already provided materials on the spot, which may be dug out and used and the surplus sold. 200,000 yards of sand at 6d. per yard would realise £5000, and under that there is sufficient clay to make 400,000,000 bricks, the average value of which would be 30s. per thousand, realising £600,000. Beneath that, again, there is sufficient chalk to make 100,000 loads of lime, which at 5s. a load would realise £25,000. Thus the materials dug out from the harbour are all fit for use in its construction, and their value in the whole would be £630,000.

TESTIMONIAL TO A SURVEYOR.—Mr. Wright, the late surveyor to the Tunbridge Wells Local Board of Health, has just been presented by a large number of the inhabitants with a purse containing £100, as an expression of sympathy for Mr. Wright's having been cruelly and unjustly treated in being summarily discharged after having served the town for so long a period.

KINGSTON BRIDGE.—A short time ago a committee was formed of six members of the Corporation of London and six members of the Metropolitan Board of Works to carry into effect the Act of Parliament entitled the Kew and other Bridges Act, the purport of which is to free from toll all bridges over the Thames from Kew to Staines. It was chiefly the energy displayed in the matter by the Corporation of Kingston that effected this, and so it was declared that Kingston Bridge should be the first to be freed from toll. Besides, there was a facility in this case not possessed by the others. There was a fixed debt of £16,000 odd to be paid to free Kingston Bridge, £24,000 of the £40,000 originally borrowed having been paid off, while for the others the amounts are not agreed upon as between the owners and the intending purchasers. On Saturday, the 11th inst., the Lord Mayor of London, Sir John Thwaites (Chairman of the Metropolitan Board of Works), Sir James Lawrence (Chairman of the joint committee), the Sheriffs of Middlesex and Surrey, the Lord High Steward of Kingston (Lord St. Leonards), the Members of Parliament, and other persons, met the Corporation of Kingston at the railway station, and proceeded in state through the town and over the bridge into Hampton Wick, the late lessee of the tolls handing the key of the gates to the Lord Mayor as he passed through. The bridge is built of the Portland oolite stone, having five elliptical arches, the span of the centre arch being 60ft. The total water-way is 334ft. The arches spring from the level of the highest recorded flood. At each end of the bridge there is also a land arch of brickwork. The whole length of the bridge is 382ft., and the width of roadway 25ft. 6in. The amount of the contract for its erection was £26,800, and the total expense, including the purchase of the site and the approaches, was £40,000, which sum was advanced by the Public Loan Commissioners at 3½ per cent. interest. The bridge was commenced in 1825 and finished in 1828.

Chips.

An anonymous contributor has given £500 to the Incorporated Church Building Society, 7, Whitehall, in aid of the special fund for mission-houses and school churches (till now quite exhausted), in the hope that strenuous efforts will be made to raise so valuable a branch of the society's operations from its present depressed state.

The foundation-stone of a new church at Selby Hill, Birmingham, will be laid on Wednesday next. The designs for the building are by Messrs. Martin and Chamberlain, of Birmingham.

A model, showing the proposed mode of completing the buildings for the South Kensington Museum, has been deposited in the library of the House of Commons for general inspection.

The *fleche* containing the chimes of the R.C. pro-Cathedral church of Our Lady of Victories, Kensington, is to be removed, and a tower built, which will add to the general effect of the edifice. It is not improbable that the gongs which now strike on high occasions will be re-placed by bells, which could not with any degree of safety be hung in the *fleche*.

A return has been issued which shows that in the year 1869 the moneys paid into the Consolidated Fund, on account of metropolitan improvements, amounted to £5844 2s. 4d. There were no advances out of the fund on that account for the year.

The parish church of Mereworth, Kent, is to be restored, at a cost of £450.

It is said that the King of Prussia has decided on carrying out the projected canal from the Baltic to the North Sea. The works are to be commenced next year, and may be finished in 1878.

The people of Burnham, Somersetshire, have decided to borrow (on loan for thirty years) and expend £1200 in town improvements.

An art exhibition will shortly be held in Derby.

The sewerage and construction committee of the Derby Local Board of Health have agreed to effect an improvement at the Corn-market end of Rottenrow, at a cost of £2400.

There is a probability that Liverpool will become a cathedral town.

For some days past the roadway in Turnmill-street, Clerkenwell-green, along the Metropolitan Railway, from near Cowcross-street to within a few yards of the Sessions House, has been sinking. Men have been at work endeavouring to arrest the process, but some houses which had been lately underpinned show further signs of giving way, much to the alarm of the inmates.

Lady Rolle on Tuesday laid the foundation stone of a new church at Otterton, on the east coast of Devon. The cost of the edifice will be about £7000, the whole of which has been promised by Lady Rolle.

MEETINGS FOR THE ENSUING WEEK.

MONDAY.—Royal Institute of British Architects. "On Some Ancient Churches of Ireland." By Arthur Hill, A.R.I.B.A.

TUESDAY.—Institution of Civil Engineers. "Description of the St. Pancras Railway Station, Midland Railway." By W. H. Barlow, M. Inst. C.E., F.R.S. 8.

" Royal Institution. "Deductions from the Comparative Anatomy of the Nervous System." By Professor Rolleston, M.D., F.R.S. 3.

WEDNESDAY.—Society of Arts. "On Submarine Channel Communication." By Thomas Page, C.E. 8.

THURSDAY.—Society of Antiquaries. 8.30.

" Royal Institution. "On the Chemistry of Vegetable Products." By Professor Odling, F.R.S. 3.

FRIDAY.—Royal Institution. 9.

SATURDAY.—Associated Arts Institute. Paper on the "Gothic Spirit in Mediæval Poetry." By B. Montgomerie Ranking, Esq. 8.15.

" Royal Institution. "On the Sun." By Norman Lockyer, Esq., F.R.S. 3.

Trade News.

WAGES MOVEMENT.

THE masons of Perth have struck for an advance in their wages. They demand sixpence per hour, which is a rise of a halfpenny on the present rate.

TENDERS.

ALDERSHOT.—For finishing hotel and pair of cottages at Aldershot. Mr. Henry Peak, architect, Guildford:—

Martin, Wells, & Batchelor (accepted)	£539 16 0

BASINGSTOKE.—For building two houses and shops on Station Hill for Mr. H. Smith. Mr. G. B. Mussellwhite, architect, Basingstoke:—

Wilkes	£892 0 0
Pelham and Tigwell	850 0 0
Jennings	812 0 0
Pistell	780 0 0
Mussellwhite and Sons (accepted)	769 19 6

BOW.—For Presbyterian church. Alexander Peebles, Esq., architect:—

		Extra for stone spire.	Total.
Barnett	£6638	£161	£6799
Bishop	5483	370	5853
Hill, Keddell, and Waldram	5466	530	5996
Fish	5289	243	5532
Mortar	5269	489	5758
Patman and Fotheringham	5250	275	5525
Adamson and Sons	5243	321	5564
Sawyer	5221	372	5593
Hill and Son	5220	310	5530
Myers and Sons	5199	280	5479
Dove Brothers	5155	250	5405
Ennor	5147	442	5589
Hume	5058	284	5342
Manley and Rogers	5021	290	5311
Nightingale	4946	350	5296

BEAFORD.—For erecting village school and teacher's residence at Beaford, Devon. Mr. F. Harger, architect:—

Bale and Son	£559
Smale, Bulleid, and Halls*	530
Howard	524

*Revised tender accepted.

BRIGHTRIDGE.—For the first section of a new church at Brightridge, Kent. Mr. Theodore K. Green, architect:—

		Extra boarding to roof.	Extra plastering to roof.
Myers and Sons	£2194	£78	£85
Sharpington and Cole	1877	97	82
Walker	1857	57	83
Anscomb	1730	80	90
Dove Brothers	1755	45	75
Willicombe and Oakley (accepted)	1595	65	97

CAMDEN TOWN.—For building 4 houses in High-street, for Mr. Bowen. Mr. W. Gosling, architect:—

Edgar	£2392
Waltham	2182
Perry Brothers	2147
Faulkner	2072
Kelly Brothers	2009
Scrivener and White	1989
Manley and Rogers	1987
Stentiford	1985
Heyward	1900
Ball	1870
Aitchinson and Walker (accepted)	1745

COLCHESTER.—For supplying and laying York paving, granite kennelling, and other work in the footpaths of Colchester, for the Colchester Town and Channel Commission. Mr. Joseph Hope, Town Surveyor:—

Everett and Son, Colchester	£2544 10 0
Lynch, Northampton	2400 0 0
Rutty, London	2165 0 0
Ewens, London	2154 3 0
Watts, Colchester	2105 9 0
Stroud, Oxford	2070 10 6
Nowell and Robson, London	2050 0 0
Knight, London (accepted)	2013 0 0

DARLINGTON.—For villa for C. Janson, Esq., Darlington. John Ross, architect, Darlington:—

Brick, Stone, Plasterer, and Slater	
J. Simpson	£751 15 0
Carpenter and Joiner.	
Martin	360 0 0
Plumbing and Glazing.	
Johnson	200 0 0
Painter.	
Davison and Sons	18 0 0
Total	£1329 17 0

Darlington.—For Rise Carr Infant Schools, Darlington. John Ross, architect, Darlington:—
Accepted tender, total amount £493 12 6

Farncombe.—For stabling, &c., to Mr. Holland's new house at Farncombe, Surrey. Mr. Henry Peak, architect:—
Goddard & Son (accepted) £315 0 0

Farncombe.—For stabling, &c., at Farncombe, Surrey, for G. J. Holl, Esq. Mr. Henry Peak, architect:—
Mitchell £313 0 0
Atfield 288 0 0
Nye 251 10 0
H. Moon & Son (accepted) 227 10 0

Hadley.—For house at Hadley, Mr. S. Dickens, architect. Quantities by Mr. L. C. Riddett:—
[illegible] £1550
Hanley and Rogers 1497
Mercy 1489
Scrivener and White 1438
Scrivener and Stevenson 1367
Walton 1319
Capps and Ritso 1295

Hatherleigh.—For erecting Nethercott Hall, Hatherleigh, Devon, for Captain Arnold; building stone, &c., found. Quantities supplied. Mr. F. Harger, architect:—
Gass £2886 4 2
Bond and Essery 2715 0 5
Call and Pethick 2644 0 0
Hookway 2624 0 0
Bale and Son 2515 0 0
Howard (accepted) 2066 10 0
Smale, Bulleid, and Halls (too late) 2339 10 0

London.—For alterations to 144, Edgware-road, for W. Reacke, Esq. Mr. W. Seckham Witherington, architect:
Mebbs £375
Mack 320

London.—For alterations to offices, John-street, Blackfriars, for S. Saviour's Union. Henry Jarvis & Son, architects:—
Deards £296 0 0
Marsland & Son 294 0 0
Tarrant 270 0 0
Baguley 233 0 0

London.—For alterations to Southwark Chapel, Longlane, Bermondsey. Henry Jarvis & Son, architects:—
Higgs £1077 0 0
Thompson 973 0 0
Henshaw 872 0 0
Wicks, Bangs & Co. 745 0 0
Tarrant 734 0 0
Rider & Son 556 0 0
Downs 536 0 0

Morton Carr.—For farm buildings and cottages at Morton Carr farm, for J. W. Pease, Esq., M.P. John Ross, architect, Darlington:—
Brick, Stone, Plaster, and Slater.
John Johnson £522 15 0
Plumbing and Glazing.
Thomas Johnson 28 12 0
Painting.
Hornby and Roberts 12 0 0
Total ... £563 7 0

Skinningrove.—For hospital at Skinningrove for the Earl of Zetland. John Ross, architect, Darlington:—
Bosomworth (accepted) £1341 6 0

Stanwick.—For gardener's cottage, Stanwick, for her Grace the Dowager Duchess of Northumberland. John Ross, architect, Darlington:—
Accepted tenders, total amount £514 13 4

Whitby.—For two villas at Whitby for Benjamin Pearson, Esq. John Ross, architect, Darlington:—
John White (accepted) £2288 10 0

COMPETITION.

Manchester, May 30.—For abattoirs and a carcass market The following premiums will be awarded:—One of £150, one of £100, and one of £75. Joseph Heron, Town Clerk, Town Hall, Manchester.

CONTRACTS OPEN FOR BUILDING ESTIMATES.

St. Giles, Camberwell, March 28.—For sinking about ten wells, and supplying and fixing pumps to the same. George William Marsden, Vestry Clerk, Vestry-hall, Camberwell.

Kirby Stephen, March 28.—For the works required in the restoration of the parish church. Architects, Messrs. Austin and Johnson, Newcastle-upon-Tyne.

Northamptonshire, April 11.—For the erection of farm buildings on the Fawsley Estate. Mr. Waters, Estate Office Fawsley near Daventry.

Market Harborough, March 31.—For building ale stores. John Ladds, architect, 4, Chapel-street, Bedford-row London, W.C.

Admiralty, March 29.—For supplying her Majesty's several dockyards with 500 loads of English elm timbers. Antonio Brady, Superintendent of Contracts, Contract Department, Admiralty, Whitehall, S.W.

Brighton.—For the erection of six fourteen-roomed houses. Mr. Crawford, 54½, Bishopsgate-street Within, E.C.

Burslem.—For the erection of a residence at Port Hill Mr. T. B. Harley, Burslem.

Midland Railway, April 5.—For the erection of stores for lost property and workshops at Derby. James Williams, Secretary, Derby.

Macclesfield, April 11.—Cheshire New County Asylum.—For the erection of gas works, steam engine, and other engineering works. Robert Griffiths, architect, Martin-street, Stafford.

London, April 5.—For the new school buildings, Crown-street, Soho. Messrs. Slater and Carpenter, 4, Carlton Chambers, 4, Regent-street.

St. Luke, Middlesex, March 29.—For re-paving the carriage and footways of Old-street, and certain other streets in the said parish. W. W. Hayne, Vestry Clerk. Vestry Offices, 2, City-road, E.C.

Metropolitan Board of Works, March 28.—For the completion of a Fire Brigade station, in Hermitage-street, Paddington. John Pollard, Clerk to the Board, Spring-gardens, S.W.

Watford, March 31.—For he providing and laying of about 2,300 feet of pipe sewers, for the alteration of sewage tanks, and other works. John Sedgwick, Clerk to the Board, Watford.

Wolverhampton Main Drainage.—Contract No. 4.—April 4.—For the construction of upwards of 24,000 yards in length of brick, stoneware, and cast iron pipe sewers, and other works. H. Underhill, Town Clerk, Wolverhampton.

Wootton-Bassett, March 28.—For the erection of two mortuary chapels and curator's house, &c. Thomas Lansdown, architect, Swindon.

South-Eastern Railway Company, April 5.—For the construction of the railway from Charlton station on the North Kent Railway to East Greenwich. John Shaw, secretary, London Bridge station.

Gedney, March 30.—For erecting a double cattle shed, wagon shed, and drill house on the farm in the occupation of Messrs. Oldershaw, and also four cottages near the church, on the Dawsmere estate, in Gedney, Lincolnshire. Edward D. Skelton, Sutton Bridge, Lincolnshire.

Hedingham Highway Board, April 7.—For the supply, delivery, and fixing of five cast-iron girders; two lengths, each 16ft., of cast-iron palisading; and two cast-iron guard-plates. Robert F. Stedman, Clerk to the Board, Sudbury, Suffolk.

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BANKRUPTS.

TO SURRENDER IN THE COUNTRY.

William James Cockell. High-street, Battersea, builder, March 29, at 10—George Dickinson, Huddersfield, brass-founder, March 30, at 11—Allen Marden Graham, New Barnes, West Malling, brickmaker, March 29, at 2—Thomas and George Page, Birmingham, ironfounders, April 4, at 12.

ACT 1869.—PUBLIC EXAMINATIONS.

April 21, T. Mann, formerly of Penge, builder—April 25, J. H. Rigden, Clapton, builder.

SITTINGS FOR LAST EXAMINATION.—ACT 1861.

April 12, J. Bennett, Eagle-place, St. James's, engineer—April 12, H. J. Dover, Upper Norwood, builder April 13, H. F. Smith, Lewisham, builder—June 30, C. Marriott and J. L. Ely, Muswell-hill-road, builders—June 30, W. Wiggett, Hartham-road, Camden Town, builder—June 30, W. Stark, Whittington-road, Peckham, builder—April 11, T. Hawkins, Blackburn, joiner.

DIVIDEND MEETINGS.

March 31, C. Schiele, Manchester, engineer—April 5, W. Shilcock, Leicester, builder—April 5, T. Matthews, Leicester, decorative painter—March 31, R. Heath, South Brent, carpenter—April 5, J. Giles, Netley, builder and undertaker—March 30, J. Cassidy, Huddersfield, plumber and glazier—April 7, J. Atkinson, Thirsk, builder—April 13, C. F. Bradley, Compton-terrace, Islington, plumber and builder—April 13, T. Adams, Ore, Sussex, builder.

DECLARATIONS OF DIVIDENDS.

H. Hillary and J. Ashfold, Canterbury-road, Kilburn Park, builders, div. 9s. 1d.—S. Bowen, Nunsea, glass manufacturer, div. 1s. 2½d.—E. Bates, West Gorton, builder, div. 2s. 4d.—R. Napper, Gulhampton, North Cadbury, Carpenter, div. 4s. 2½d.

SCOTCH SEQUESTRATIONS.

Alexander Robertson, Birnam, lime merchant, March 26, at 12—John Armour, Irvine, builder, March 30, at 12.

PARTNERSHIPS DISSOLVED,

Robinson and Hall, Hull, machine joiners and wood cutters—Crowther and Foster, Halifax, builders—Hartley and Co, Calverley, stone merchants — Reade and Co., Wolverhampton, varnish manufacturers—Rothwell and Colbage, Edgeworth and Haslingden, builders—Green and Nash, Bradford, Yorkshire, builders—Clayton and Co., Lombard-street, engineers—Williams and Lowe, civil engineers.

LATEST PRICES OF MATERIALS USED IN CONSTRUCTION.

TIMBER. Duty 1s. per load; Drawback, 1s.

	£ s.	£ s.
Teak ..... load	11 10	12 5
Quebec, red pine	3 15	4 15
,, yellow pine..	4 0	5 0
St. John, N.B. yellow	0 0	0 0
Quebec oak	5 15	6 5
,, birch	3 15	4 15
,, elm	4 5	5 5
Dantzic oak	1 5	6 5
,, fir	2 5	4 0
Memel fir	2 5	3 10
Riga	2 17	3 2
Swedish	2 0	2 13
Masts, Queb. red pine	3 10	6 0
,, yellow pine ..	4 5	6 0
Lathwood, Dant. fm.	4 0	6 0
,, St P'burg.	6 0	6 5
Deals, pr C. 1ft. by 3 by 9 in. duty 2s. per load, drawback 2s.		
Quebec, white spruce	12 0	17 10
St. John, white spruce	12 0	16 0
Yellow pine, per reduced C.		
Canada, 1st quality..	16 0	19 0
2nd do.....	12 0	13 0
Archangel, yellow ..	10 10	12 10
St. Petersburg, yel...	11 0	12 0
Finland	6 10	8 0
Memel	7 0	9 0
Gothenburg, yellow	7 10	9 15
,, white ..	0 0	0 0
Gefle, yellow	9 0	10 10
Sub-Each	8 0	9 10
Carelia, pcr C. 12 ft. by 3 by 9 in. yellow	10 0	12 10
Flooring Boards, per sq. of in., first yel.	7 6	10 6
First white.....	7 0	9 6
Second qualities	6 0	7 0
PUMICESTONE per ton	6 0	8 0
OILS, &c.		
Seal, pale .. per tun	43 0	0 0
Sperm body.....	91 0	0 0
Cod	38 10	0 0
Whale, Sch Sh., pale	39 0	0 0
Olive, Gallipoli.....	58 0	59 0
Cocoanut, Cochin, tun	44 0	0 0
Palm, fine	40 10	0 0
Linseed	32 0	32 5
Rapeseed, Eng. pale..	44 10	0 0
Cottonseed	31 0	37 0

METALS.

LEAD:—

		£ s.	£ s.
Pig, Foreign	per ton	18 7 6	0 0 0
,, English, W.B.	do.	19 10 0	0 0 0
,, Lead Co.	do.	19 5 0	0 0 0
,, Other brands	do.	18 15 0	19 0 0
Sheet Milled	do.	19 5 0	19 10 0
Shot, Patent	do.	22 0 0	0 0 0
Red or minium	do.	20 10 0	0 0 0
Litharge, WB	do.	0 0 0	0 0 0
White ditto	do.	26 0 0	28 0 0
,, ground in oil	do.	25 0 0	29 0 0

COPPER:—

		£ s.	£ s.
British—cake and ingot	per ton	70 0 0	0 0 0
Best Selected	do.	71 0 0	72 0 0
Sheet	do.	75 0 0	78 0 0
Bottoms	do.	74 0 0	0 0 0
Australian	do.	71 0 0	74 10 0
Spanish Cake	cash	0 0 0	0 0 0
Chili Bars	,,	66 5 0	67 10 0
,, refined ingot		69 10 0	71 10 0
Yel. Metal Sheathing & Rods .....per lb.		0 0 6½	0 0 6¾

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The Nails are manufactured by J. J. CORDES and Co. out of Scrap and the best kinds of Pig Iron, and have long since earned the reputation of being superior to all others. The Nails are all uniform in make and quality, each one perfect and count out full 1,000 to the M.
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THE BUILDING NEWS.

LONDON, FRIDAY, APRIL 1, 1870.

ENGLISH MANSIONS AND COUNTRY HOUSES.*

HARDLY less comprehensive than those moral treatises which undertake to teach the whole duty of man are some which are occasionally published by architects, as setting forth their views upon the theory and practice of their profession. It is not quite easy to understand for whom these works are specially intended. Following, yet apparently ignoring such standard books of reference as Gwilt's "Encyclopædia," which most architects have upon their shelves, and dipping quite as widely but less deeply into matters of construction and accommodation, they would seem to be too superficial for the student, and yet too technical and profuse to engage the interest of the public. Probably their only, as well as obvious purpose, is to increase the *clientelle* of their authors, and to secure its confidence in their skill and ability. It is a different matter when a professional man has had considerable experience in a special branch of design, and it becomes then a graceful act on his part to give the benefit of such to the world and to his brethren, but we fear few persons are really benefited by compilations of hasty thought and dogmatic statements upon multitudinous subjects, accompanying series of designs equally heterogeneous. We have before us two works of this character, for which we are unable to discover a sufficient *raison d'etre*. The autobiography of an architect should be that written in his works. In these the trivial becomes transitory, the important alone remaining as permanent testimony of his powers. We would not wish to be understood as suggesting that there is not in either of these works much that is both useful and interesting, though both would have been improved by condensation and limitation of subject. Mr. Wilkinson's quarto book is, in fact, a volume of his own designs for houses, villas, parsonages, and cottages, to which is prefixed what is termed, "A Practical Treatise on House Building," to which latter our preceding remarks apply. It only occupies thirty-five pages, and discusses in the most cursory fashion the duties of an architect and his subordinates, the requirements, the materials, and the workmanship of buildings. In the plates Nos. 1 and 11, are represented Chadlington House, Oxon. The plan seems well arranged, except that on the ground floor the watercloset is enclosed in the centre of the building. The exterior grouping is wanting in simplicity. Better in the latter respect, and fairly picturesque, is Wootton House, Oxon (plates 3 and 4). It would have been improved by a higher development of the quasi-tower over the staircase. The position of the dining-room is objectionable, as the hall has to be traversed in serving it. Bignell House, Oxon (plates 5 and 6), has a well-arranged plan, and is stately as well as picturesque. It also would have been a better composition had its tower been raised considerably. Norham Manor, Oxon (plate 7) is spoiled by the paltry projection of the entrance gable, as are the house on Norham Manor (plate 11), and another at S. Giles, Oxford (plate 13), as well as some other smaller buildings by fanciful excrescences. Several farmhouses and cottages are simply and well treated. All the designs are in the mediæval domestic character, and, with the exception of a few features, are unexceptional in style, though not remarkable for originality. On the whole, the collection of designs given by Mr. Wilkinson, in this work, are creditable specimens of modern English country houses.

Mr. Richardson's octavo volume is of a more ambitious character, and is embellished by no less than about 500 original engravings. These consist of numerous plans for cottages, villas, and mansions, &c., "many of which have been carried into execution, selected from a large collection of similar subjects, the result of many years' professional experience." An introductory chapter on the picturesque in relation to architecture carries the reader from the Grecian temple, draped with curtains and festoons, to the Roman ruins, by nature and decay invested with the same quality, and the Gothic styles of which it was the greatest charm, back again to that of aborigines, and buildings based on the imitation of nature, completing "a brief and necessarily very imperfect *resumê* of the progress of architecture." Thence he is brought to the designs of the author, which have for their object the suggestion of "the most approved, tasteful, and effective plans for the mansion, the villa, and the cottage," the avoidance of smoky chimneys, the perfection of the means of warming and ventilation, and appropriateness of the decorations of houses, and even their accessories.

To illustrate one of the latter, a vignette of "a ruined fountain, designed in 1820 by one of the best teachers of drawing England ever possessed, the late C. J. M. Whichelo," is introduced. It forms a curious climax to a somewhat confused burst of eloquence; and we trust the reputation of the said deceased artist rests on other and better foundation. Another garden fountain in ruins, for which, in preference to perfect ones, our author seems to have a strange predilection, precedes some designs and a description of a gardener's cottage, and we regret to say that the step is to the ridiculous, if it does start from the sublime rather than the vague. We are at a loss to know why all its angles should be canted off, seeing that there is plenty of room to get round them; or what can be the object of the portentous finial upon the principal gable. Apropos of nothing but to fill up pages, various bits of ornament of a miscellaneous description are interspersed, and their style is of the worst rococo; note those on page 43, 47, 53, and elsewhere. In design No. 5, a double cottage and village Sunday-school, we noted a capital group of chimney stacks, the detail of which is given in page 57, but the text tells us that this is copied from a very fine ancient example at a farmhouse at Ashford, in Kent.

Several designs for park lodges are imitations of castellated architecture, or miniature copies of collegiate towers, with oriel windows overhanging Tudor arched gateways; that in design No. 11, page 90, is without sufficient abutment. A detail of the bay window is given; but we are told that it is copied from one at the old gatehouse at Montacute, in Somersetshire, both as to dimensions and detail, and we cannot forbear expressing our opinion that we should prefer the design first-hand, and with its original context.

Perhaps, however, the most comic thing in the collection of designs is one of a stove, No. 12, p. 93. No words of comment are needed to the author's description. "This stove is intended to fill a recess in the hall of a baronial mansion, placed on a marble pavement with groups of ancient armour, pikes and helmets, and the warlike implements of ancient times surrounding it. The plan shows its interior to be filled with fire clay. It is only a common stove, but with a more artistic outline or figure than is generally seen." (It represents three parts of a man in armour!) "A movable box is placed within the pedestal to receive the ashes; the smoke flue leaves at the back; the helmet opens to receive a cup of water."

In his description of design No 13, Queen's Gate Lodge, Hyde Park, the author, writing of what he is well acquainted with, gives an interesting account of the attempt made by him, as surveyor to the estate of the Earl of Harrington, to embody in his designs the views of His Royal Highness Prince Albert for the erection of buildings for the purpose of science and art at Kensington; and though he quotes an amusing paragraph in which the Albert Hall is ridiculed, he looks forward to the time when it will become the nucleus of a structure of a similar character to that conceived by the Prince, when the present National Gallery will be wanted for a Bank of England or Royal Exchange, and the prejudices of our generation to the removal of the pictures thence will be overcome, as South Kensington will have become central as Trafalg ar-square in the future extended metropolis. To this account is appended numerous details as to the value of land in the neighbourhood, particulars of iron gates at Queen's Gate Lodge, and a disquisition upon foundations of buildings, damp-proof courses, and fireproof construction: all things very well in their way, but out of place in such a volume, nor do we discover in the remarks any special novelties.

The remainder of the book is occupied with what may be termed gossip about various buildings erected by the author or projects for what he would like to have built, the latter even more profusely illustrated with woodcuts than the former. The most crotchety castle in the clouds—and there are several such—is set forth with plans, sections, elevations, and perspective views, sketches of bargeboards, finials, ceilings, and other details mostly of the Batty Langley type of Gothic or rococo Renaissance. No less than a dozen woodcuts are devoted to the elucidation of a design for a gimcrack bath-house and summer-room that somebody or other was once crazy enough to think of building "in a prominent position in a park in Kent." Another design fully set forth was made for a Roman Catholic chapel and schools intended to occupy a site leading from the High-street in a very fashionable district "immediately out of London," and we shudder to think from how great a peril so near neighbours have been fortunately delivered.

A picturesque façade for "A Villa in the Old English Wooden style," which attracted our eye, we find stated to have been taken from an elevation given in "John Thorpe's Sketchbook." It has, however, given occasion for a disquisition of several pages in length upon the ancient wooden-constructed houses of England, in which there is much antiquarian information given on the subject, and which is very readable.

Design No. 29, for "A Sculptor's Villa," is a characteristic chapter of our author's. He tells us that in 1850 he became for a short time the guest of a gentleman who had succeeded to the possession of more than a million of wealth. The vision of a chance to help such a Crœsus to expend a portion of this wealth seems to have been too much for him, and he forthwith commenced an appropriate design for a villa to properly exhibit Classic sculpture. A grand gallery in the centre has a staircase contrived to wind round a group representing the Capture of the Queen of the Amazons. "But the possession of only a million of money gives a moderate income compared with that of the Sovereign Popes at the time the Vatican was erected," and so, though unwillingly, economy must be considered, therefore "Underneath the gallery were supposed to be large cellars for wine. These had a private entrance through the pedestal of the Amazonian group, as shown in the plan and section to a larger scale." The ingenuity of this contrivance, however, needed to be supplemented by the following naive apology that "the collection below was supposed to be as valuable as the one above, and calculated to yield as much enjoyment, and one certainly that would be more highly appreciated by a greater number of persons." The method of warming this imaginary Elysium is then elaborately described with the aid of woodcuts, and the systems of rival inventors balanced and discussed. Somewhat

* "English Country Houses," by WILLIAM WILKINSON, architect, of Oxford.
"Picturesque Designs for Mansions, Villas, Lodges, &c., &c.," by C. J. RICHARDSON, architect.

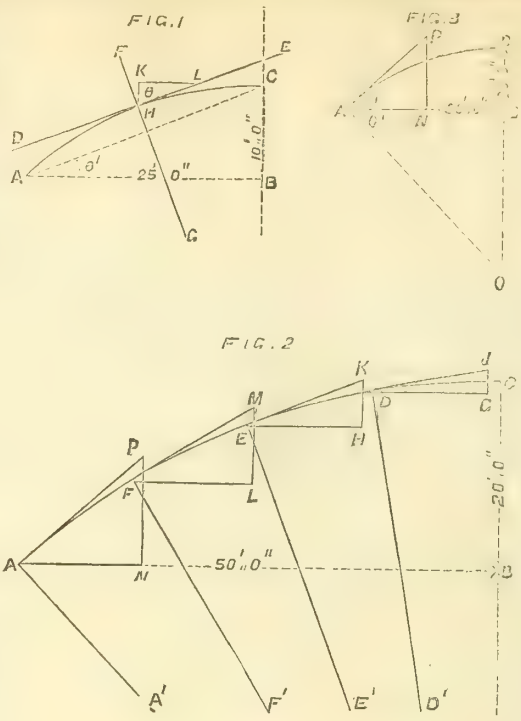
further on an entire chapter is devoted to "The Fireplace, Flue Construction, and Smoke Prevention," and may be read with much profit. In it the author says rather pertinently, "It may be asked what has a work on "Picturesque Architecture" to do with either smoke or sewer gases?" And as the purpose of his argument is to point out how our buildings might be made less unsightly by the effects of smoke, and as he has given much attention to this important subject, we are not disposed to quarrel with the interpolation of the chapter in question.

Harrington House, Queen's Palace-gardens, is the heading of the last chapter, and the flattering letters from the Earl for whom it was erected will render Mr. Richardson very independent of our own captious remarks. After having lived in it a season he writes that it is "a house without a fault." Perhaps the fault that we should find with it was due to the Earl himself, who, we are told, insisted upon having it built in his favourite—the Gothic—style, and the complacency with which our author reproduces some of its details would lead us to think that both the owner and his architect were rather easy to please—where ignorance is bliss, however, it would be folly for us to strive to undeceive them. Let us allow that the plan is a stately and good one, and that comfort and convenience seem to have been admirably studied throughout. "These objects being attained," says Mr. Richardson, "any real or imaginary faults perceived by professional critics may be palliated, if not forgotten." After such defiance why should we restrain or conceal the smile with which we turned to the last page? where, with another characteristic step from the sublime to the ridiculous, we are abruptly taken from the premises of the noble Earl to contemplate two engravings of a most commonplace "cut-wood canopy to a door at West Brompton, a short distance beyond the Metropolitan District Railway. It has been constructed about twenty years, and stands well."

We would, however, part with our author as pleasantly as may be, by expressing sincere admiration of his design No. 38 for encaustic tiles, which forms one of his "slight digressions," though we must decline to follow him in commending those which are to be seen on columns in the South Kensington Museum.

ARCHED ROOFS.—No. II.

IT has already been stated that arched roofs may be classed under one of two heads, those having solid and those having open or braced webs. The first of these will now be considered, for which purpose it is necessary to have clear ideas of the general manner in which the arch is affected by strains. On the supposition of a uniformly distributed load, and that the form of the arch is a parabola, the horizontal thrust may be assumed to be constant from the crown to the springings. This thrust answers to the strain at the crown, and when it has been once ascertained, the strain at any other part may be found from it. Taking W to represent the total load on the arch, L the span, R the rise, and S the strain at the centre of the arch, the usual formula gives $S = \frac{W\ L}{8 \times ?}$. This, it will be seen, is the same formula that obtains for the strain on the flanges at the centre of a girder having the same span as the arch, and a depth equal to its rise. Applying this rule to th diagram in fig. 1, we have L = 50, R 10ft. 0in., and making W = 20 tons, the value of the central strain is $S = \frac{20 \times 50}{8 \times 10} =$ 12·5 tons. Similarly, the strain at any other point may be found by calculation, but it is not so correct as that given by a diagram, for the reason, already stated, that the conditions



assumed in theory and in the calculation do not actually prevail when the arch takes its real form. We will first ascertain the strain by calculation at any given point (H in fig. 1). Let W^1 equal the load upon the arch situated between the crown and the point H, and S the strain already found at the crown. Putting S^1 for the strain at H, the equation becomes $S^1 = \sqrt{S^2 + W_1{}^2}$. In the present instance S = 12·5 and W_1 = 5 tons; so that $S^1 = \sqrt{12{\cdot}5^2 + 5^2} = 13{\cdot}46$ tons, equals the strain at the point H. This is a special example, but generally, if S be the strain at the crown, W the weight between the crown and any point x where the strain is required, then the strain S^1 at that point is obtained from the formula $S^1 = \sqrt{S^2 + W^2}$.

It is obvious that the greater the discrepancy between the real form of an arch and a parabola the wider will be the departure in practice from the results arrived at by pure theory. We may now proceed to calculate our strains by diagram, and first for the strain at the crown. Referring to fig. 1, let F G represent a portion of the radius of the arch; draw D E at right angles to it. D E will consequently be a tangent to the arch at the point H. Make H K, drawn vertically, equal to the load situated between the crown of the arch and the point H. Draw K L horizontally to meet H E at L, then K L is equal to the strain at the crown C. In fig. 1, H K is made equal to 5 tons, on a scale of 20 tons to one inch, and K L measures exactly 12·5 tons by the same scale, which is the value already found for the central strain by calculation. As the strain at the crown is horizontal, the calculation and the diagram coincide accurately in the result, which is not the case at any other point of the arch, the discrepancy increasing the nearer the point approaches the springing. It is not difficult to demonstrate this mathematically. In the triangle H K L we have H K = K L × tangent of angle K L H. Put angle K L H = θ, then H K = K L × tan. θ. Draw the line A C, then A C is parallel to D E, and the triangles H K L and A B C are similar. Consequently the angle K L H equals angle B A C. Calling this angle θ' we have $\theta = \theta'$ and H K = K L × tan θ_1. But by construction the tangent of angle $\theta' = \frac{B\ C}{A\ B}$. But B C = R and A B = half span of arch = $\frac{L}{2}$, so tan. $\theta' = \frac{R}{\frac{L}{2}}$. Substituting this value in the equation, we obtain H K = K L × $\frac{R}{\frac{L}{2}}$. Referring to the diagram in fig. 1, and using the same notation as before, H K = $\frac{W}{4}$ and K L = S = the strain at the centre of arch. Putting in these values in the formula we get

$$S = \frac{\frac{W}{4}}{\frac{2\ R}{L}} = \frac{W \times L}{8\ R}$$

which is the formula given at the commencement of our article. It should be remarked here that the value of R in both figs. 1 and 2 is about twice that which would be given to it in practically designing a roof. The reason it is so proportioned in the diagrams is to allow the construction of the strains to be better shown, which would not have been the case had the arch been drawn too flat. The space at our command does not permit of the diagrams being made on the same scale as they would be in the engineer's and architect's office.

Having shown the method of ascertainin by diagram and calculation the amount of the central strain, it now remains to find that at any other point by the former mode of analysis. Let us suppose that it is required to determine the strains at five equidistant points of the arch represented in fig. 2. That at C has been already determined for the case in fig. 1, and can be equally readily obtained for that in fig. 2. In this instance L = 100, W = 40, and R = 20, and the central strain S will equal 25 tons. To determine the strains at the other points D, E, F, and A, draw the lines D D', E E', F F', A A', towards the centre of the circle of which the arch is a segment. They are, therefore, parts of the several radii, and the lines D J, E K, F M, and A P, drawn perpendicularly to them respectively, will be tangents to the arch at the points where the several strains are required. From these points draw the horizontal lines D G, E H, F L, and A N, making each equal the strain at the centre, or equal to 25 tons. From the end of these lines draw verticals to meet the tangents, and the several strains at the points D, E, F, G, will be given by the lines D J, E K, F M, A P. If they be measured on the diagram upon a scale of 20 tons to one inch, they will read 25·5, 27, 29·5, and 34·5 tons respectively, or rather more than what they would amount to by calculation by the ordinary formula. There is, however, an accurate method of calculating the strains at any point which will serve to check those obtained by the aid of a diagram. The strains vary as the secant of the angle which a tangent at any point makes with a horizontal line. When this angle is known the strains can be determined.

In fig. 3, let the diagram be a reproduction of that in fig. 2, only on a smaller scale, in order to allow of the centre of the circle being shown. Suppose it is required to find the strain at the springing of the arch—as before, let A P = S^1 = required strain, S = that already found for the crown, and put θ for the angle P A N. Since the angle P A O is a right angle, the angle P A N is the

complement of the angle B A O. Making this latter equal to θ', we have $\theta = (90° - \theta')$. If the angle θ' were known, the problem is solved. To find θ', we use the trigonometrical equation of the triangle A B O, in which the angle A B O is a right angle, and B O = A B × tan. θ', or tan. $\theta' = \frac{\text{B O}}{\text{A B}}$. But B O is equal to the radius of the arch minus its rise. Calling the radius of the circle R^1, then B O = $R^1 - R$. When the span and rise of an arch is given, the radius is found from the equation—

$$R^1 = \frac{L^2 + R^2}{2R}$$, when L is the half span. In this case $R^1 = \frac{50^2 + 20^2}{2 + 20} = 72{\cdot}5$ft.

From this B O = 52·5ft. By logarithms we have—log. tan. θ' = log. 52·5 — log. 50 + 10. Solving we find $\theta' = 46° 24'$. Consequently $\theta = 43°{\cdot}36'$. Referring to fig. 3, in the triangle A P N, A P = $\frac{\text{A N}}{\cos.\ \theta}$. But A P = S' and A N = S', therefore S' = $\frac{\text{S}}{\cos\ \theta}$. By logarithms log. S' = log. S — log. cos θ + 10. Putting in the values for S and θ', we have log. S^1 = log. 25 — log. cos $43°{\cdot}36'$ + 10. Solving for S^1 we finally obtain S^1 = 34·52 tons, which is the same value as that given by the diagram in fig. 2. If the values of the secants of the other angles made by the tangents with the horizontal lines be found, the resulting strains at those points can be also determined. As many points may be taken as considered desirable, but unless the arch is very large, four points will be sufficient for practical purposes. In our next we shall give an example of an arch roof with internal bracing, such as is commonly adopted for railway stations and roofs of large span, where an uninterrupted space below is the chief desideratum.

ART IN THE THAMES EMBANKMENT LAMPS.

SINCE the days of Sir Christopher Wren, when he proposed to re-model the plan of London City, after the great fire, there surely has not been so great and good a chance of at least commencing so much needed a work as was offered accidentally to the man who was fortunate enough to be entrusted with the construction of the Thames Embankment. And equally sure it is that no failure of doing anything really great and of lasting fame and endurance ever came to be made. It is very difficult, in a few words, to characterise the multitude of mistakes and shortcomings in this important work, for it is all wrong from the very beginning of the idea to the last ending of it. The river, and the constant sight and view of the ever-moving water, was the first and main thing to be kept in perpetual view, and should have been that to which all other considerations should have been subservient. Everybody, however, knows—every man, woman, and child knows—that to see the moving water of the river you must stand close to the heavy, stupid, close parapet, and almost tumble over it, to get a sight of the river at all; so that instead of taking advantage of the idea which nature provided, that very help and key-note itself has been actually blotted out! If you want not to see the River Thames, you have but to wander down to its embanked shores. We say nothing at present of the huge blocks of granite which make their appearance every now and then just where they are of no sort of use or meaning, and where they indicate nothing; or of the arches such as that opposite the Temple Gardens, a splendid opportunity, built only to be walled up again, so no mortal can ever pass through it or under it. What is this awkward archway for, or what does it mean? We say nothing of these curious things, but only hint at them by way of asking for some information, and pass on to the grand and crowning completion of the Embankment scheme—the lamps, which are to light up its dulness at night. These lamp standards seem to me very notable things indeed, and well worth a little thought and a few lines of comment, and may be, a hint or two. It is a curious thing to consider how singularly unpractically we practical people go about things. There are just three of these lamp standards, and but three, and out of them but two have the names and consequent personality of the artists who made them attached to them. One is modelled from a design, and that by an architect, and the other is apparently by nobody in particular. Why, we may ask, were not a larger number of artists applied to for designs, and models as well as mere designs, for so important and conspicuous a work, and one so difficult to do well, though to some it may seem easy? It might well have tempted some of the students of the Royal Academy, and if so we might have had some real *bonâ fide* works of art by the youthful artists themselves, for they could not have employed others to do the work, whether good or ill, for them. If these Academy students had been appealed to, the public might have had a series of designs everyone of them different, instead of, as will most surely be the case, some two or three hundred gas standards all cast from the same mould, and that one the very plainest and dullest of the three.

But let us glance for a moment at each of these three designs that are now offered for public inspection, and the approval of those who are supposed to be the most capable of judging of their claims and merits. We would begin with what we may call design No. 2, from the firm of Messrs. Turner and Allen, and designed, as we must suppose, and afterwards modelled and worked out, by Mr. S. Burnett, carver. It should always be clearly stated whether the "designing," as it is termed, and the actual execution, are by the same person, so as to avoid confusion, for this lamp standard does not look as if the workman of it had made the drawing for it as well. We give him the credit of both. We have had in our time something to do with carvers and modellers, and think it a great pity that so much of evident painstaking and careful modelling should have been thrown away and lost in the accomplishment of actual falsity, and in the modelling of nothing. Not to waste time on it, let anyone, not art instructed, look at the head and mouth of the fish or dolphin, as we suppose it must be called, and then go to the nearest fishmonger's (Grove's, Whitehall), and look at any sort of fish he likes, from a sprat to a monster salmon, or even flattened red herring, and then ask himself whether there ever was, or can be, either in the water or out of it, any such animal, or any such mouth. Why should the public be compelled to accept such work as this? It is a very difficult thing indeed to model even a common leaf, and still more difficult to model a fish's body and a fish's mouth, and to catch any of the life and expression which it always has in it; but the only way to approximate to either is to study and try to copy the living animal as it moves and swims. Nobody can invent these things; they must be seen and drawn and modelled while under eyesight. All that can be said to the carver or modeller of this fish and standard is to wish him better luck in future and no drawing to work from, and thus drive him to the fishmongers, or, better still, the decks or holds of the fishing smacks off Billingsgate Market.

No. 1, as we have ventured to call it, is but a poor affair, and hardly worth talking about; it is said to be designed by Mr. G. Vulliamy, the architect of the Board of Works, from a recollection of some such work at Rome. The name of the actual artist or modeller is not given, so that it is impossible to say well how it was conjured into existence. It was modelled from a drawing from the office of the architect, certainly no part of it from any real living thing, as will be evident enough by a glance at the claws and feet and legs of the lion, which the foot of the standard is supposed to represent. Of all things to be found in nature at once indicative of suppleness and strength, the legs of the carnivora are the most notable. The most imaginative of men may try his best, as many have done, to picture this in any sort of material or way, and may perhaps, to a certain extent succeed, but a single momentary glance at the living animal itself, whether lion, tiger, or panther, will in one instant put to shame all his fancied powers, and he will but own that Dame Nature has had the best of it, and has already provided for him models to work from which infinitely surpass all he could have imagined or thought about. The whole of the rest of this design has been evidently modelled from a drawing, and is as hard and lifeless as the common plaster ornaments to be seen everywhere. It was a good thought of the modeller of it to hide himself from the public and to leave the glory to Mr. Vulliamy.

We have left till the last the most important and telling of these three designs or models, and about which there has been a good deal of talk. We confess at once that when we first saw this gas standard we hardly knew quite where we were. It really looked as though John Bull had at last got hold of an idea, and meant something or other. Was it French, or Hindoo, or had the New Zealander at last appeared, and brought a gas lamp with him wherewith to illuminate things before the ruin came? It seems to me very creditable to the Coalbrookdale Company that they have not appropriated this design to the firm themselves, but have honestly left the credit of the work to the real working man, Mr. Butler. How far this clever artist has been left to himself it would perhaps be difficult to say, for the awkward "cornucopias" pouring out their gifts of plenty, and typical, as we are told, of British commercial industry, could seem hardly to have occurred to the same man who thought of the climbing boys; the one idea has nothing whatever to do with the other, and really spoils the composition as a whole. But the wonder with me is at the boldness and hardihood of the modeller, and the Coalbrookdale firm, too, in offering to our dear British public, and to the important Board of Works, such a rude idea as this. If, instead of naked climbing boys applying a torch to a gas lamp, out of all proper police rule and respectable order, Mr. Butler had represented a surpliced chorister kneeling at the foot of the said gas lamp invoking fire from above, what a beautiful idea would it not have been, and pronounced on all hands to be, and from every voice, and from every printing press. But perhaps Mr. Butler is a man of genius, and will not work in the orthodox groove, so we must take it as it is; and here we cannot help finding almost infinite fault with it, not because it goes too far, but because it does not go far enough! Did Mr. Butler ever see a half-naked boy climb up a common lamp-post or park tree? if so, he never saw the originals of his two figures. They are totally and altogether wrong, both in form and action and method of lighting—*i.e.*, if the said youths were left to their own resources, and to do the work in their own way. If the artist has "postured" his models according to Academy precedent and method, it may be all right, but according to rough and untutored nature it is all wrong. The newspaper accounts call both figures boys, but the lower one is not the figure of a boy, but a small man, and so is the face, head, and neck, and the action as well; while the upper figure is a child, not such a figure as would be likely to climb a lamp-post in the face of the policemen and the Board of Works! What a state Art is in! Here is a very clever working artist with a good thought in his head, and

a ready and skilful hand, aiming at what is in reality a great and colossal work, and with power at least to do something, wasting his powers in the production of mere falsity, from the simple cause of want of proper objects to see, and, having seen, to go by. It is a dismal and a stupid failure, and only serves to show how much of real and strong art talent there is amongst us, and how it must, as things now are, be wasted and end in failure. We would have said something on the modelling, as it is called, of these two well-intentioned figures, but our space forbids. What a pity it is that this workman has not another chance, and that instead of there being, as there surely will be, some two or three hundred of Mr. Vulliamy's drawings of Roman lamps down one side of the dull Embankment, and up the other side of it, all cast from the same mould, the Board of Works cannot be induced to give these men another fair chance—their own chance—not through any firm or architect, and let us see what they might do. This would drive each one to his wit's end. Mr. Burnett must go fishing somewhere after a fish's mouth; the nameless man who modelled Mr. Vulliamy's drawing into practicality would go to the Zoological Gardens, perhaps, after lions' feet and claws, and Mr. Butler would be compelled to wish that there were fewer police about everywhere, so that he might indeed see for himself how a ragged and shoeless boy looks while climbing a lamp-post, and how another ragged boy would stand on the pedestal of it and look at him. I heartily wish these clever men another try for it, and commend them to truer models: models not taken from drawings on paper, but from the forms to be found in nature, and not even from art examples, even though they be of the best, but from the primitive inspiration of all art—Nature herself. Surely the great future of art, which by the way is not as yet begun, may be slowly predicted from even such works and efforts as these. To vivify the dull streets of this brick and mortar built and architecturally brainless London, even with the naked forms and active movements of climbing boys, the man of the highest powers must be inspired, not by models and Academy rules and posturings, but by the ever-recurring sight of Nature in the freedom of her action and ways of work, and it is not in the forms and studied movements of well-dressed young gentlemen that these are to be seen, but in the wild ways of those who have nothing to call their own, or to boast of, but the fast circulation of their blood, and the wild and may be glorious freedom of a lawless nature. The very hardest problem of modern and Western civilisation is to find the foundational ideas in actual Nature on which the future of Art, in the fulness of its meaning, is to be, or can be, built.

C. B. A.

The Maintenance of Crown Roads.—At the last meeting of the Marylebone Vestry, a letter was read from the First Commissioner of Works, stating that the board had under consideration the subject of the maintenance of that portion of the Albert-road, Regent's Park, extending from the bridge over the Regent's Canal, near S. Mark's Church, to a point nearly opposite to S. John's Wood Chapel, in the parishes of S. Marylebone and S. Pancras, and that the board had arrived at the conclusion that the duty of maintaining the road properly belongs to the parishes, so far as the road and paths extend within their respective boundaries, and not to the Office of Works.—The vestry clerk said some years since an understanding had been arrived at between the Office of Works and the vestry to the effect that the Crown was to maintain the works in question.—It was resolved to communicate with the Office of Works on the subject.

Royal Birmingham Society of Artists.—The usual Spring exhibition of this society was opened on Thursday week. The exhibition is said to be of average merit, and includes some works by Turner, Rosa Bonheur, F. Tayler, David Cox, W. Hunt, De Wint, Prout, John Gilbert, Walter Goodall, Louis Haghe, Vicat Cole, A.R.A., Birket Foster, T. M. Richardson, Fred Goodall, R.A., Clarkson Stanfield, David Roberts, &c.

Building Materials and Appliances.

Architectural Association.

At the usual fortnightly meeting of this association on Friday evening last, Mr. Lacy W. Ridge, President, in the chair, Messrs. Herbert A. Lacy, F. Pither, T. Hallowes, and W. A Large were elected as members. It was announced that a series of visits was being organised to the works of various firms engaged in the production of building materials, and that the class for surveying would commence on Monday next, the 4th inst., at 8 p.m. A letter was read from the contractors for the restoration of the Chapter House, Westminster, accompanied by photographs of the tombs of Henry VII. and his queen, Elizabeth of York. After a few remarks by the chairman, the best thanks of the meeting were given to the donors.

Mr. J. Douglass Mathews, A.R.I.B.A. (Hon. Sec.), then read a paper on

Recent Improvements in Building Materials and Appliances.

In his introductory remarks, Mr. Mathews said that architects were, with truth, designated a Tory lot, for let an invention be ever so good they would not adopt it for a considerable time, but when it proved successful they all followed each other like a flock of sheep. It should be remembered, however, that an architect incurred responsibility in introducing an untried invention, for in case of failure it was he who was blamed and not the manufacturer. In the interest of his clients, therefore, an architect was bound to be thoroughly satisfied with an invention before he recommended it. After suggesting that manufacturers should co-operate in making their inventions known to the profession, Mr. Mathews referred to the Museum of Building Appliances, remarking that though it was a move in the right direction, it was not sufficiently comprehensive. If a permanent exhibition on a large scale was impossible, an annual one might be instituted, and the lecturer thought that not only the profession but the public would take sufficient interest in such an undertaking to render it successful. Mr. Mathews next suggested that in all cases architects should be put in full possession of the prices of the several articles, remarking that if the unhealthy principle of high trade discounts could be given up, and an uniform rate of say 15 per cent. allowed, much would be done to secure co-operation. As it was, if an architect specified a material or article not in general use, the manufacturer of which, perhaps, allowed a less discount to the trade than could be obtained by the use of another article, much opposition was frequently given, and when such material or article was adopted, little care was taken to make it successful; in fact, the prejudice of contractors went further to prevent the introduction of new materials than even the caution of architects. Mr. Mathews next proceeded to describe some of the most useful and most recent improvements in building materials and appliances. These might be classified under three heads, viz:—(1) Materials for general building and for protection against the weather; (2) improvements conducive to health; and (3) appliances tending to increase comfort and economy.

Remarking first on concrete building, Mr. Mathews said that three years ago the modern method of concrete building was in its infancy. Tall's method* was one of the earliest introduced, and a warehouse in Suffolk-street, Borough, constructed on that principle, appeared satisfactory. Drake's apparatus for building in concrete,† he believed, possessed some advantages over Tall's, one being that it was not so unwieldy. Drake's stone-breaking machine‡ was referred to as a useful auxiliary to the concrete building apparatus. Osborn's "General Builder"§ was next noticed. It was observed that this invention appeared to possess peculiar facilities for securing increased speed and efficiency in construction. It is so constructed that a double, or morning and afternoon system of shift may be worked, so that two heights may be done in a day, with, it is stated, the same safety as a single shift. It has one continuous upward movement, thus avoiding the necessity of dissevering it from the walls by its repeated resetting. The machine on either side of the wall works independently or conjointly, at will, with that on the other side, and the panels may be lengthened or shortened at pleasure, and shifted every ½in. in height, so that projecting timbers and stonework, such as purlins, corbels, mouldings, &c., may be built in as the work proceeds. Messrs. Parr and Strong's system of construction* was next mentioned, and the Broomhall Tile Company's mode of employing concrete cased with patent brick blocks† was very favourably spoken of by Mr. Mathews, as, amongst other recommendations, it presented a well-finished and nice looking wall surface on both sides, thus in many instances rendering an internal coat of plaster unnecessary.

In connection with the construction of hollow walls, Tutte's patent slate and iron wall-ties were favourably noticed, with respect to both utility and economy. The utility of the slate ones would of course depend to a great extent on the security and immovability of the foundations. In this connection Jennings's glazed and perforated bonding brick was also noticed as being useful. One great thing to be attended to in the construction of all walls, whether hollow or not, was to prevent the rising of damp. This object was very efficiently attained by the Brownhall Tile Company's perforated damp-proof course, and by a patent of Mr. Jennings's. The penetration of walls by damp was effectually prevented by Gay's patent colourless waterproofing process. This was also useful in preserving stone. It was invisible, insoluble, and durable and effective. As far as Mr. Mathews had tested it, its waterproof qualities were perfect. Gay's impenetrable paint for stone, brick, cement, iron, &c., Professor Church's stone-preserving and indurating process, and Devaux's silicate of zinc paint, were next noticed.

Pether's diapered bricks, manufactured by the Burham Brick and Tile Company, were commended, and

The lecturer next proceeded to notice the various systems of fireproof floor construction. Dennett's fireproof construction‡ was well-known, and very reliable. It had been used in the most important recent buildings, such as the new Foreign Office and S. Thomas's Hospital. Moreland's system, as used at the new Midland Hotel, was next described. Phillips's system§ was next noticed, it being remarked that this was the only system which had yet been put to the test on a large scale by a fire. Allen's system, as used in the Ebury-street dwellings, was next noticed.

Passing on to roofing materials, Mr. Mathews first noticed the Broomhall tiles, which he said made a good roof, and answered their purpose well. The Vieille Montagne zinc was also very light, durable, and economic, but should only be used on roofs at some distance from the ground. Atkinson and Michael's asphalte roofing pasteboard‖ was also described as a desirable material in many respects.

The patent Victoria stone, or petrified concrete (as laid down in the Poultry, opposite the Mansion House), Jennings's patent capped drain-pipes and patent connector, Mansergh's ventilator, Jennings's patent closet, Patten's Brazilian closet Antill's and Tye and Andrew's stench traps, Walker's patent compound-action locks and latches, and several other inventions, were next briefly mentioned.

Haines's lead-encased block tin pipe¶ was next referred to, and to say nothing of its sanitary advantages as a preventive of lead poisoning, it will commend itself to builders and architects on the score of cheapness, as the patentees are able to sell all sizes of their pipe at a price per yard less than that of common lead pipe of equal strength.

Potts's ventilating cornice** and Mr. Jennings's plan of slating (by which the amount of slate which overlaps in the ordinary method is saved) were next described. Jackson and Son's carton-pierre was referred to as a light and well-moulded article, much used for the roofs of ceilings of theatres and other buildings where rapidity of

* Building News, p. 499, Vol. XIII., and p. 461, Vol. XV.
† Building News, p. 44, Vol. X. X VII.
‡ Building News, p. 177, Vol. XVII.
§ Building News, p. 551, Vol. XVI.

* Building News, p. 579, Vol. XV.
† Building News, p. 774, Vol. XV.
‡ Building News, p. 626, Vol. XIII.
§ Building News, p. 130, Vol. XIII., and p. 857, Vol. XV.
‖ Building News, p. 576, Vol. XVI.
¶ Building News, p. 353, Vol. XVII.
** Building News, p. 805, Vol. XV.

construction was aimed at. The Stockholm joinery (much used at the new S. Thomas's Hospital, and much cheaper than English work) and Harrison's shutter-shoes were favourably noticed. Meakin's patent sash-fastenings were next mentioned, and Messrs. Hart and Son's patent piston-spring reversing-bolt locks, with circular ends, were noticed as possessing extreme simplicity of construction, no liability to get out of order, and convenience in fitting. These locks were as cheap as those of any make equal in strength and workmanship. Hodgson's "Citadel" lock* and Hawksley's step-protector† having been noticed, an enumeration of several miscellaneous inventions brought the paper to a close.

Mr. Blashill, the Chairman, and others having made a few remarks, the customary vote of thanks was accorded the reader of the paper, and the meeting adjourned.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

At the ordinary general meeting on Monday evening last, Mr. Charles Barry, Vice-President, occupied the chair. Several donations of books, &c., were announced by the honorary secretaries, including a splendid series of photographs of the new Palais de Justice, Paris, the gift of M. Duc, the architect. The Chairman next called attention to a new terra-cotta brick, produced from a quarry in Yorkshire belonging to Mr. Davison; the price of these bricks was 4s. per thousand, delivered at the railway stations in London. He (the Chairman) had tried them, and found them very serviceable, as they possessed hardness, density, and truth of shape.

Professor Donaldson then read

A Short Memoir of the late William Burn, Fellow.

The Professor said that the Institute had recently lost, by the death of Mr. William Burn, one of the earliest members of their body. He joined the Institute in 1835, being at that time one of the most respected members of the profession in Scotland. Born in Edinburgh, December 5, 1789, he grew up in stirring times of intellectual progress. Mr. Robert Burn, the father of the subject of this memoir, united in his avocation the operations of a builder and architect, one of his works in this capacity being the Nelson monument on Calton Hill. Anxious to ensure to his son William the best education in his profession, he sent him up to the office of Mr. (afterwards Sir) Robert Smirke, who then divided with Mr. (afterwards Sir) John Soane a large and important practice. Here he remained for three years, and had an opportunity of studying the principles of construction in various important works, including Covent Garden Theatre, built for John Kemble. Returning to Edinburgh, he succeeded to the business of his father, which he greatly extended, and for twenty-eight years he pursued a useful career in the "Modern Athens." The earliest productions of Mr. Burn seem to have been greatly influenced by the strict Greek bias of Sir Robert Smirke, but his later works are free from slavish adherence to any particular style. His earliest important work seems to have been the Custom House at Greenock in 1816. He was patronised by the highest nobility and aristocracy, and so particularly did he study domestic architecture that he became the almost exclusive designer of the country houses of the nobility and gentry throughout Scotland. A characteristic feature of Mr. Burn's career was the deep and loyal interest he took in his native country and her ancient monuments and castles. The picturesque early domestic architecture of Scotland was studied with great zeal by him, and this naturally led to the desire of seeing it illustrated in the same manner as the antiquities of England had been by Britton; consequently between 1840 and '42 appeared the volumes of the "Baronial Halls of Scotland," a most valuable contribution to the archæological literature of the North. This publication was due to the generous advance of £1000 by Mr Burn. Domestic architecture was his *forte*, and about 500 works of this kind were executed by him, of which many were extensive mansions for the nobility, one of the latest being Montague House, Whitehall, for the Duke of Buccleuch. Every part of his detail drawings were delineated by his own hand with the greatest clearness, and he was untiring in his endeavours to meet the wishes of his clients. With rare ability, patience, and perseverance, he would change and modify his plans over and over again to suit his employers; at the same time, he was a man of the highest honour, integrity, and independence. He was extremely averse to incurring unnecessary expense, and often delayed commencing work in order to avoid it. He never engaged in competitions, being unwilling to enter into such rivalry with his fellow professional brethren. He held for many years the appointment of consulting architect to the Government in Scotland. He followed a sound principle in not seeking employment, but waiting until he was sought. In many instances he handed over to younger professional men commissions which he had received. If his career was not what might be called a brilliant one, it was one in which calm common sense was conspicuous throughout. He died on the 15th February last, aged 80, and is buried in Kensal-green Cemetery.

The Chairman said he could not let this notice of Mr. Burn's life pass without bearing personal testimony to the extreme kindness of Mr. Burn to those younger than himself. His business habits were a remarkable feature in his life, and but for the fact that some of his works bore great merit as works of art, he might be said to have been more a man of business than an artist.

Professor Kerr said the career of Mr. Burn was a most instructive one. He was practically a useful servant of the public, and the success which had attended his endeavours to satisfy the public was an encouragement to architects to adopt a fair and practical course in their dealings with the public. It was no easy thing, as many could say from personal experience, to satisfy the demands of the higher classes of this country for any considerable time; and when Mr. Burn had maintained a reputation throughout so long a time in so very difficult (though apparently so easy) a matter as the designing of gentlemen's houses, he must be accorded credit and distinction of a very high order. It was the fashion nowadays to judge architects by other than professional standards, but he hoped that the Institute was proof against such a fallacy, and would attach to the reputation of such a distinguished architect as Mr. Burn the very highest sentiments of its approbation and applause. Mr. Burn's plans of country houses were, one might say, faultless; he had so thoroughly acquired the mastery of the demands of that particular style of building—and those demands were neither few nor small—that he was able, as far as he (the speaker) could judge, to accomplish in the most successful manner the provision of the demands of his clients, and in a systematic way which no one else in the country seemed to have possessed. Any one who would devote himself for a little time to the consideration of Mr. Burn's plans would arise from their study with the reflection that there was something exceedingly skilful in his administration of affairs.

The Rev. E. L. Cutts, M.A., then read a paper

On the Desirability of Restoring the Italian Churches of London.

After a few prefatory remarks, the rev. gentleman said that some architects had supplied designs of their own for the restoration of individual Italian churches; among others, Sir Digby Wyatt had prepared designs for the restoration of S. Lawrence, Jewry. Mr. Burges, too, had successfully restored the chapel of Worcester College, Oxford. His (Mr. Cutts's) object in mentioning these was to bring the various essays of the kind to a focus, in order to promote the suitable restoration of the Classical churches of London. The taste of the church building and restoring public was one so exclusively in the direction of the Gothic revival that it had failed to do anything like common justice to Classical architecture in general, and to the Italian churches of London in particular. Of the latter there were many of great merit, and there were others which, though not so remarkable for merit, were passable; others, again, stood very low as works of art. But taking the best of them, many were very cold and very unchurch-like in appearance at the present time; so, indeed, were the "churchwardenised" Gothic churches of bygone days. Some of these Italian churches would no doubt need as great and as careful restoration as many Gothic edifices have received, and a clean sweep would have to be made of lobbies, galleries, &c. In restoring such buildings it would be necessary, he presumed, to put painted glass in the windows, very generally, and colour and gilding on the walls and internal architectural features. It would also be necessary to replan the area, so as to fit it for the purposes of the modern style of service; the furniture should be in harmony with the style, and yet ecclesiastical in its general effect. But to restore these churches successfully, two important conditions must be adhered to—viz.: First, the restoration should be quite in harmony with the architecture of the building, and not an attempt to Gothicise; secondly, such restoration should be ecclesiastical in its feeling and character. He would instance three or four churches in illustration of his meaning. In the church of S. Martin's-in-the-Fields, one would suggest, perhaps, that the galleries should not be taken away, for two reasons—firstly, they could hardly be spared, for the church was well attended and the room was needed; secondly, because the church was rather low in proportion to its other dimensions. Many other suggestions as to the arrangement and decoration of this church were given by Mr. Cutts, but as his MS. could not be borrowed, we are unable to give them with anything like accuracy, the extreme volubility of the reader rendering it impossible for the reporters to follow him. The churches of S. Mary-le-Strand, S. Mary Woolnoth (which was described as very unchurchlike in plan), and S. Stephen's, Walbrook, were also referred to, and suggestions for their restoration and decoration thrown out by the rev. lecturer. In conclusion, he said he should be very glad to see S. Mary-le-Strand first taken and dealt with in the manner he had described, which he believed could be effected at a cost not exceeding £1500. S. Mary Woolnoth was also worth taking in hand, for when properly restored, it would present the finest Classical interior in the metropolis.

An interesting discussion followed, in which Messrs. C. F. Hayward, E. I'Anson, J. P. Seddon, J. G. Crace, E. Nash, Webb, T. Morris, Fowler, and Professors Donaldson and Kerr took part, and the thanks of the meeting having been given to the readers of the papers,

The Chairman announced that the next meeting of the Institute would be held on May 2, when the presentation of the gold medal and other prizes would take place.

The Voluntary Architectural Examination.—The rules and regulations for this examination, to be held in May next, are now being re-issued, after careful revision. In conformity with a resolution passed at the closing general meeting of the Institute last session, candidates who pass in the respective classe of proficiency and distinction will receive certificates to that effect. Members of the Institute are earnestly requested to encourage their pupils and clerks to prepare themselves for this and for the Preliminary Examination intended for students who have been not less than one year in an architect's office.

District Surveyorship Examination.—An examination of candidates desirous of obtaining certificates of competency to act as District Surveyors will be held at the rooms of the Royal Institute of British Architects, on Thursday the 28th and Friday the 29th of April, in accordance with the usual conditions advertised.—At a meeting of the Board of Examiners held on Friday the 28th January last, under the Metropolitan Building Act, 1855, the following gentlemen were recommended to the Council of the Institute for certificates of competency to perform the duties of District Surveyors, and reported to the Metropolitan Board accordingly:—Daniel R. Dale, 13, Angel-court, E.C.; Banister Fletcher, 24, Bedford-square; James W. Forge, 34, St. Mary-at-hill, E.C.; Horace Gundry, 13, John-street, Adelphi; and John Goldicutt Turner, 15A, Wilton-street, Grosvenor-place.

An Example to be followed.—The whole of the doors of the Metropolitan Tabernacle, Newington, have been made to open *outwards*, and additional staircase accommodation provided. The example thus set by Mr. Spurgeon and his deacons is one which ought to be followed in every building in which large numbers of people assemble, in order to prevent the recurrence of the fearful loss of life which has so frequently followed an alarm of fire.

* Building News, p. 500, Vol. XVI.

† Building News, p. 242, Vol. XV.

BRIEF CHAPTERS ON BRITISH CARPENTRY.

By Thomas Morris.

(*Continued from page* 233.)

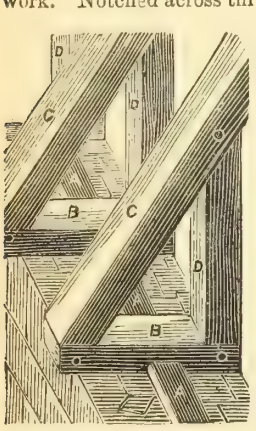
The Hall of Nursted Court, A.D. 1330.

Nursted Court, from which the next example is derived, and which we shall illustrate next week, was the seat of an ancient family in Kent. Sir Stephen de Gravesende is supposed to have commenced the buildings about A.D. 1283, and Richard de Gravesende, Bishop of London, to have completed them in the next century, to the early part of which, Mr. William Twopenny concurs in attributing the subject of this engraving. The hall with its lofty tiled roof was, as usual, the chief feature of an irregular pile of flint walls, with Caen stone dressings to quoins, doors, and windows. Before its demolition, drawings were taken by Mr. Edward Blore, with the accuracy for which his representations are always remarkable and thus it has been figured in the "Gentleman's Magazine" 1837, and the "Domestic Architecture" of Turner and Parker.

The peculiar framework for supporting the roof at once attracts attention, and viewed in a progressive light it well deserves consideration, but in order to appreciate its merit we must bear in mind the arcades and walls of other examples, and the solid gables that must have curtailed the view of the upper part of the roof. Here we find in their stead large purlins supported by curved struts and oak columns with cross arches at intervals for giving stiffness to the whole. Mr. E. B. Lambe, who also made drawings, noticed some diminution in the columns, which in that respect differed from stone shafts of the period. The foliage of the capitals and terminations of the purlins were beautifully wrought.

In roofs of this kind the purlins were not always in contact with the rafters, but the connection was made by one series of vertical pieces of the same scantling as the rafters, and another series of similar pieces fixed horizontally.

Great care was taken to give the rafters a firm footing on the level top of the wall. A plate of moderate scantling was embedded along the centre, so as to leave about half its depth rising above the face of the stonework. Notched across this were pieces which may be termed sleepers, reaching from one face of the wall to the other at suitable intervals. The outer end of each sleeper received the foot of a rafter, and from the inner end there arose a vertical strut, flush with the face of the stone ashlaring of the wall, a circumstance from which these small timbers have received the name of ashlar-pieces. The ordinary construction is shown in the annexed figure.



Ancient Mode of Connecting Walls and Rafters.

A A, wall plate, B B, sleepers, C C, rafters, D D, ashlar pieces. Every rafter had thus a secure footing, and gravity and friction were turned to the fullest account. Moulded plates were occasionally framed to the cross-sleepers and ashlar pieces to form a sort of wall capping or cornice, and in other instances it was merely attached to the face.

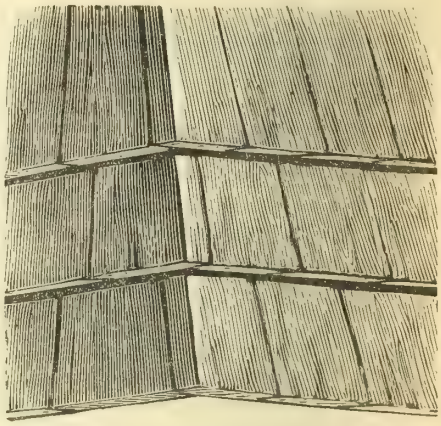
The rafters of the opposite sides of the roof were in pairs, halved and pinned together at the top without the intervening ridgepiece of modern work; early roofs were frequently without any longitudinal connexion except that of the outer laths and thatch; but more was unnecessary. In examples of very moderate span may be found rafters perhaps six inches by four used flat wise, and rarely more than eighteen inches apart. Even when ridge-timbers became general they were usually placed beneath the rafters, which were halved and pinned at the top as before. Pulham Church, Norfolk, may be instanced, and this method has appeared so convenient that I have adopted it in ordinary domestic roofing, trussing the ridge, which at the same time gives to the sill piece power to support ceiling joists.

The length of rafter at Nursted rendered necessary further support than was afforded by the base and apex, and purlin. A level strut was therefore introduced in each pair of rafters, to keep them from sagging under their heavy load of plain tiles. These level struts were upheld by a longitudinal plate or purlin in the centre, supported by shafts standing on the crowns of the arched principals; and such shafts are frequently called crown-posts. Further, to keep the struts up to their positions at the ends, there are auxiliary struts from the rafters themselves. Thus the tendency of the rafters to bend inwards under external pressure was counteracted by internal provisions, and the weight was uniformly thrown upon the walls or upon the assisting columns.

In some roofs the oblique struts under the crosspiece were carried above it to the opposite sides in a saltire figure, as at Lympenhoe Church,* and in other cases a second level piece is framed higher up from rafter to rafter, as at Stowe Bardolph.* Instances occur, though whether by design or accident is uncertain, where the upright ashlar pieces at the base, the portion of plain rafter, the raking struts, and the crosspiece or level strut, are all of equal length, and thus facilitate the formation of ceilings of seven sides, so common at one period in chancels.

It is possible that the plain tile covering at Nursted may have superseded some other material. It is the heaviest of any commonly used substance, and three times as weighty as thatch, which was in general use at the time of this erection. The pitch of the roof is well adapted also for shingles, at that time in vogue, and though discarded where danger from fire is imminent, never entirely disused. The Saxon thegne, says Hudson Turner, "built his hall from the woods on his demesne, by the labour of his bondsmen; it was thatched with reeds or straw, or roofed with wooden shingles." They are now perhaps as much used in America and the West Indies, as at earlier, ascending even to Roman periods, in this country, and they seem to combine in a high degree the conditions of lightness and duration. Reduced to the proper form by cleavage, the fibrous character was unbroken, the inclined position and exposure insured abundant ventilation, and the rapid passage of rain. It is probable that the process of water seasoning, indeed, was resorted to. Evelyn advises that boards should be laid a fortnight in water; if running, so much the better. "I the oftener insist," he says, "on this water seasoning not only against the worm, but for its efficacy against warping and distortions of timber, whether used within or exposed to the air." The marginal sketch shows the spire-covering at Aldenham Church, Herts, where the gauge was four inches and the width about the same, so that each piece would be about ten or eleven inches by four. "In no case does a spire covered with this material appear to have failed. These spires are very frequent among the old churches of Kent and Sussex, and are exceeded by few in simple beauty and appropriateness of character."—Street, S.P., R.I.B.A.

It must not be forgotten that as well for fixing tiles and shingles, as for giving firmness to the joints of framing, the carpenter employed no other fastening than wooden pins. These were of oak, and a better appliance could not have been found, as is attested by the revolution of ages. The use of trenails must have been coeval with the earliest attempts in ship building, and they still unite the planks and timbers of our "wooden walls." The posts and rails of fencing are among the



Shingle Covering, Aldenham Church, Herts.

objects also connected by wooden pins, the toughness of oak, and the expedient called the drawbore, enabling the workman to bring the parts of his work together with considerable force, though care should be taken to avoid an excessive strain. The application of trenails has been latterly extended to railway purposes in fixing chairs and sleepers, and a system of compression in heated dies, to give increased strength, and prevent shrinkage, has been patented.

* Figured in "Brandon's Roofs."

THE BUILDING NEWS SKETCH-BOOK.—No. XXII.

CANOPIES OF STALLS, KING'S COLLEGE, ABERDEEN.

Of the large group of buildings of which King's College at present consists, the tower and chapel are all that remain of the original edifice, which dates from the beginning of the 16th century, and is supposed to have been of very considerable extent. The other buildings are modern, and it is much to be regretted that more is not left of the original, the architecture of which is at once so peculiar and interesting.

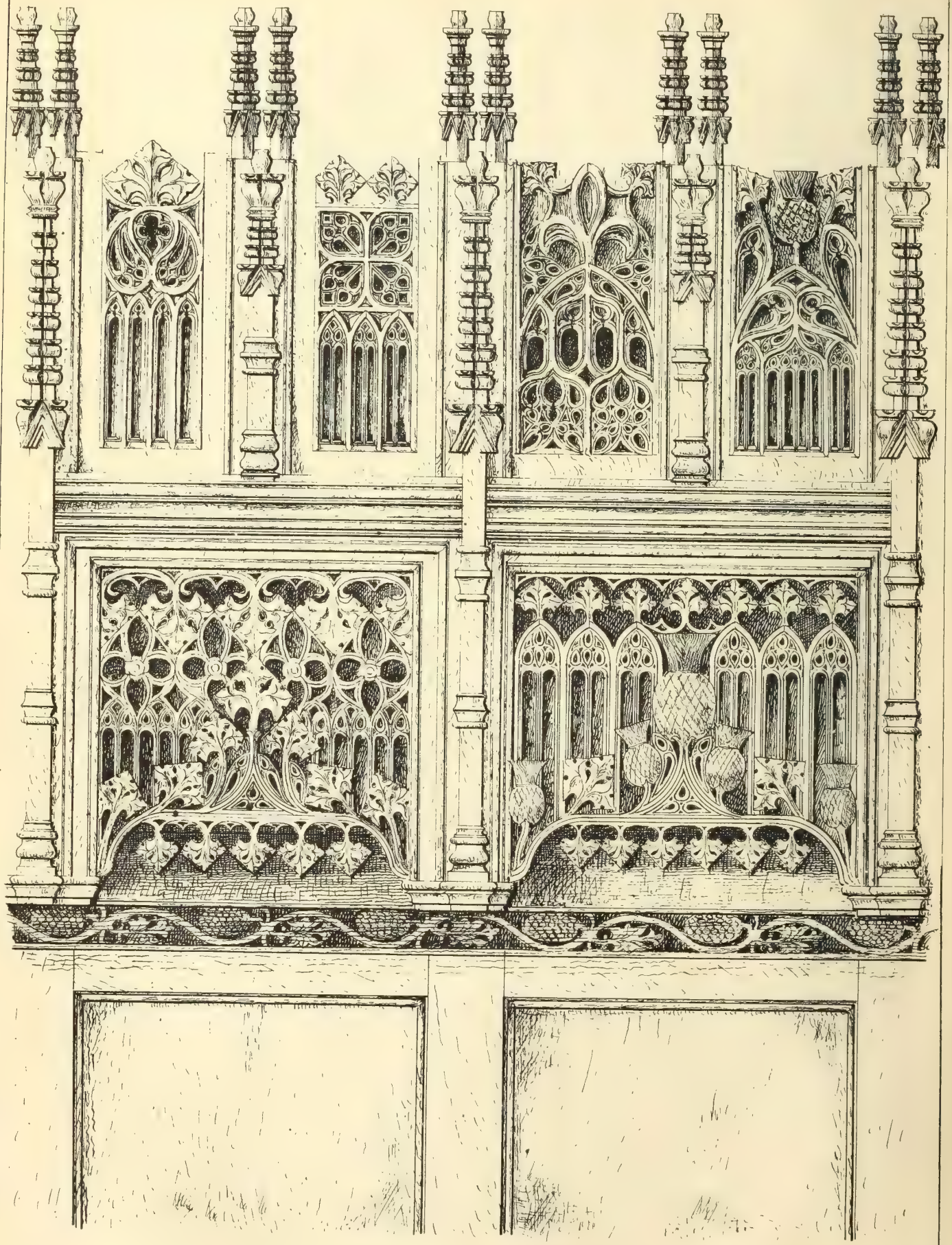
The principal feature on entering the chapel, and that which at once attracts the attention of the visitor, is its richly carved woodwork. This consists principally of a number of canopied stalls with misereres arranged on either side of the choir, the nave of the chapel being partitioned off and used as a library. The canopies of two of these stalls form the subject of the accompanying sketch for The Building News Sketch-book.

There is also a fine and elaborately-carved open screen, the effect of which, however, is unfortunately lost by the partition which cuts off the nave being built immediately behind it; but as the new library building is now almost completed, it will not be long until the partition is removed, and the nave and choir again thrown into one.

The design of the panels, as will be seen from the sketch, consists chiefly of an imitation of window tracery, Flamboyant in character, and the carving throughout is of the most elaborate and delicate description.

The panelling of only two canopies is here represented, and although there are altogether 90 such panels, each is different in design. As illustrative of the friendly relations long existing between the two countries, it is interesting to note the fleur-de-lis of France side by side with the thistle of Scotland. Undoubtedly this old chapel contains the finest and most perfect specimens of wood carving now existing in Scotland.

The Bermondsey Vestry is, with the approval of the Metropolitan Board of Works, about to borrow £8000 for street paving.



CANOPIES OF STALLS. KINGS COLLEGE CHAPEL ABERDEEN.

Measured & Drawn by P. Hunt.

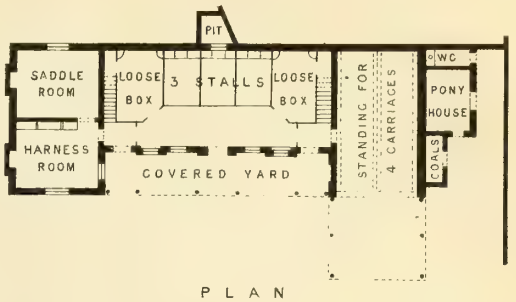
Printed by Waterlow & Sons

STABLES FARM BUILDINGS &c.

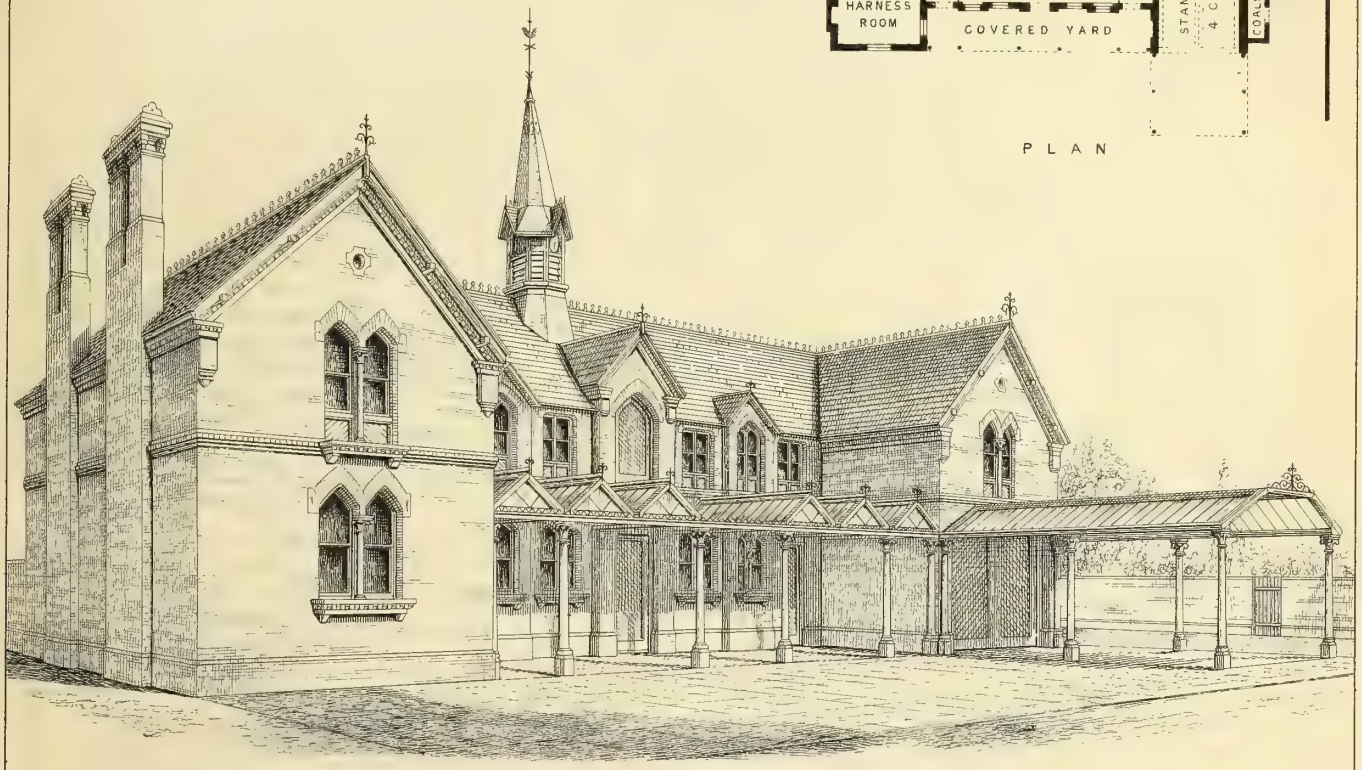
FOR

R. J. ASHTON, ESQ. BISHOP-GATE HOUSE.

RAWLINSON PARKINSON, ARCHITECT.

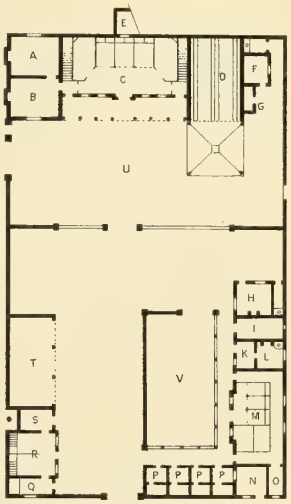


PLAN



REFERENCE.

A. *Saddle room.*
B. *Harness Dº*
C. *Stable.*
D. *Coach-house.*
E. *Litter place.*
F. *Loose box.*
G. *Coals.*
H. *Workshop.*
I. *Fowl house*
K. *Root Dº*
L. *Bowling Dº*
M. *Cow Dº*
N. *Calving Dº*
O. *Fodder.*
P. *Piggeries.*
Q. *Hay room.*
R. *Cart-horse stable.*
S. *Harness room.*
T. *Cart shed.*
U. *Stable yard*
V. *Fold yard.*



GROUND PLAN.

Cor. Green Lith.

Printed by Waterlow & Sons.

Furniture & Decoration.

COLOURS USED IN DECORATION.

By an Experienced Workman.

HAVING briefly noticed the white leads and other whites commonly ground in oil, we have now to speak of those white earths, &c., which are useful in distemper or water colour; the principal and most important of which is whiting. It is essentially a water colour, and cannot be used as a paint in oil. Whiting is prepared from white chalk, which is a carbonate of lime. There are several other native earths suitable for distemper of different degrees of whiteness, such as Spanish white, Paris white, satin white, &c., more useful to the paper stainer than to the house painter, but which may be used occasionally for special jobs; but for all useful purposes, the best washed whiting is amply sufficient. When it is pure and finely levigated, it is smooth to the touch, free from grit, and is generally supplied in balls or oblong lumps; and when mixed with a proper vehicle has a creamy appearance, and in working, lays on smooth and even, and lies level when dry. On the contrary, bad or impure whiting is coarse, dark coloured, and full of grit, and whatever vehicle is used it works ropy, and lays off in ridges, and is apt to show the marks of the brush when dry. If the work done with it is examined, it will be found to be rough, uneven, and shady, and it is not possible to turn out good work with it.

Zinc white may also be used in distemper colours, especially when an exceedingly pure white is required, it having a much greater body than whiting, and consequently a stronger or more solid white may be produced with it. It will also keep its colour better than any other white used in water. There are several methods of working and mixing distemper colour, and a number of vehicles or sizes may be used for the purpose, of which we purpose to speak hereafter.

The manufacture of colours has become in our day an important branch of practical chemistry. Paints and colours can be had ground in oil by machinery. Dry colours are furnished so finely levigated, and reduced to such an impalpable powder, that many of them can be mixed at once with oil or water without the trouble of grinding.

It is not very many years ago since the painter had to grind all his own colours, but now this is all done for him, and the number of colours has been so much increased that even hues and tints are manufactured. This being so, it would be a waste of time to describe the different processes of manufacture; we therefore only purpose here to describe such colours as are indispensable in making hues, tints, and shades of colour for interior decoration.

Of yellows, the ochres are the most useful, and, like most native earths, are permanent colours, more or less powerful according to their kind. The best of this class is Oxford ochre, and is found in the shire from which it derives its name. It is of a rich, warm yellow hue, and is useful for mixing with white for making cream colours, buffs, and the ground colours for imitation wainscot oaks, &c., and almost any tone of stone colour may be made by adding a little burnt umber or black; also a variety of quiet neutral green tints by adding Prussian blue and a little Indian red to Oxford ochre and white. There are a number of other ochres which are useful for ordinary work, such as stone ochre, Roman ochre, Italian ochre, and others, but for real sterling qualities none are equal to Oxford. There is a Welsh ochre, of not much use when ground in oil, but which is very much used to mix with paper pulp in making smooth yellow brown papers for wrapping and packing purposes; it is also used for mixing with the pulp for making what are called in the trade pulp paperhangings, or self-ground papers, in contradistinction to the better class of papers, on which a ground colour has to be laid before printing. The ochre and other colouring matter in the pulp forms a ground colour in itself, which only requires the pattern to be printed upon in body or opaque colours; blue, black, or red has only to be added to the ochre in the pulp, to form a variety of grounds. Of chrome yellows we have a variety of shades, from deep orange to pale primrose, intensely bright yellows, of great pureness and brilliancy, chemically a chromate of lead; it is of so bright and prominent a character that we know of scarcely any position in which it may be used in its pure state; even pure tints, when nearly white, require a little red adding to them in order to sober and tone them down, but if so used with Indian red a great number of warm, quiet yellow tones may be made in admixture with white; and if chrome, Indian red, and a little black are used we get another series of useful tints, of a rich hue, of great value in colouring. Chrome yellow is a valuable pigment for mixing with blue to make bright greens, with red to make orange, and with red and black to make olive. In combination with Prussian blue and Antwerp blue, chrome yellows make brilliant greens of all shades, but according to Field they ultimately destroy these blues, and therefore it is better to use the manufactured greens. Tints made from chrome yellow alone do not harmonise well with other colours, but have an obtrusive garish look, which should always be subdued with red.

Terra de Sienna, technically raw sienna, is a native earth of a deep and permanent yellow colour, of good body, and transparent, not very useful for making tints with white lead, but of great service as a glazing colour, and in the imitation of satin wood, and other yellow woods. In glazing imitation marbles it is useful, especially those of a yellow colour; and when it is burnt, it becomes of a deep red orange hue, much more transparent than in its raw or unburnt state, and is then invaluable for imitating mahogany, amboyna, walnut, and several other woods; and as a transparent glazing colour. Burnt sienna may also be used in producing certain tints of warm neutral greens, in admixture with blue or black, which cannot be got by any other combination of colours.

Of blues, we have also a variety, the principal of which is ultramarine blue, which in purity of colour, harmony in combination, and generally useful qualities, is infinitely superior to any other blue. The real ultramarine, which is made from lapis lazuli, is a permanent colour, indestructible by time or fire, but is destroyed immediately by acids. The factitious ultramarine is a manufactured pigment, the best of which is produced in France and Belgium, also, to some extent, in England, but not so successfully as on the Continent, on account, it is said, of the difference in climate, as it requires to be manipulated upon bright sunny days only. In colour it is equal to true ultramarine, and is a permanent colour, varying in colour from deep blue to a light azure. Of all blues it is the farthest removed from green (although we have a green ultramarine not of much use in house decoration.) White destroys the vividness of the blue, but does not affect its usefulness, inasmuch as no other tints of blue harmonise so sweetly as those made from ultramarine blue, with the addition of a small quantity of red. All other blues have a cold greenish tinge, in comparison, and therefore require so much red to neutralise that property that the purity of the blue is injured. Another blue of the same character, and almost as bright as ultramarine, is named lime blue, on account of its capability of being mixed with quick lime without being injured thereby. Newly plastered walls may thus be coloured by tints of blue grey; or by adding a little Indian red, a series of warm lilac or pure tones may be used, which will keep their colour. It is a very useful pigment in water, but of no use whatever in oil.

Cobalt is a somewhat similar blue to ultramarine, but of a bright hue, not so well suited for decorative purposes as that pigment.

Prussian blue is a deep toned and powerful blue colour, of vast body and considerable transparency; valuable in compounding greens, in combination with ochres, chromes, siennas, and other yellows, and for making hues and tints of purple when mixed with lakes or other red colours, and mixes well with white lead. It is not so permanent a colour as ultramarine, but will last quite long enough for all ordinary purposes.

Antwerp blue is an exceedingly transparent blue, of a peculiar tone, very valuable as a glazing colour, in combination with yellow lake, for enriching and deepening the colour of all imitations of green marbles. Some very good tints may be made from it for use in contrast, but used with white alone it does not blend harmoniously with other colours, except in very delicate tints, it being of a very cold, hard tone.

(To be continued.)

ON SURFACE DECORATION.*

MOSAIC painting, as it was called in the reign of Constantine, when Byzantine decoration was at its height, must have been very gorgeous; being often upon gold ground work, and the ornamentation being composed of small cubes, it sparkled with great brilliancy. There were two descriptions, namely, "opus tesselatum" and "opus sectile." In the first, coloured glass was chiefly used; in the second, marble only, which was cut into the form required by the pattern. Its greatest merit is its durability, and from the nature of the work could better be executed by a skilful experienced hand in following set lines and given ornament, rather than designing original composition. It has been cleverly revived not long since, and no doubt will be more extensively used. I cannot say that I am particularly charmed with it, perhaps because I have seen but little; but mosaic must ever be in comparison to encaustic painting as the best executed scagliola is to real marble; it may be the exact colour, the exact imitation of vein and carefully polished surface; the real marble shades and glistens as the rays of light fall upon or through it, and the least stroke of the pencil in painting shows the play of the hand or the instant idea of painter; but as the scagliola lacks the life of the marble, so the mosaic, from the fact of its mechanical construction, possesses but little intellectual charm, and lacks the instant finish and effect produced by encaustic painting.

Paperhangings are the most prominent wall decoration in our day, and, since so much has been said about them, and the question of style has been so often discussed, I will only refer slightly to them. It was the fashion, before manufacturers were relieved from the duty upon paper, to paste sheets of paper together (after the excise duty had been stamped on each sheet) into lengths of 12 yards; afterwards it was ground-coloured, and then printed upon with blocks.

Stencilling, a method of decoration either in oil, colour, or distemper, was then also much in fashion. It was one of the most cleanly methods of decoration, especially for bedrooms, I ever saw. The walls were coloured the preferred ground, and then the patterns, which were cut out with a penknife in painted vellum or oiled drawing-paper, were rubbed over with brushes of flattened surface, dipped into the desired tints of colour, and when dry looked exceedingly well if carefully executed. At this time good patterns, in the hands of a judicious, careful man, may be used for some of the best kind of flat decoration, although paper is so general. Walls always look well in tints of green, olive, and grey; and drab or fawn colours, if diapered with green, red, marone, and gold, have generally a good effect.

Impressed gold papers, printed with finely-engraved brass dies, have been lately introduced, and for workmanship cannot be surpassed. The patterns shown are good examples; the great reason being, apart from their richness, there is no attempt at shadow, which should always be avoided. The ground colours are laid in a careful and superior manner, and soft good effect is obtained. The specimens of flock paper are the

* *Concluded from page 235.*

reverse of the impressed gold, for as in one case the gold leaf is pressed by a warm cylinder into the ground colour of the paper, so the relief effect accompanied by real shadow is produced by printing the block in flocking size and flocking the same, repeating each process several times until the desired relief is formed. The pattern is then in relief in white flock upon a sized white paper ground. Flock paper is very easily applied, to the wall, and is especially suitable for panel decoration; it may be finished after being sized with ordinary glue size, and one coat of paint to prevent absorption in any tint of distemper colour, or finished in paint, and relieved with colour and gold according to taste, finished as the style of the room or staircase may require. The newest French paperhanging patterns are raised in relief, and some have edging of gold as embroidery, producing the exact effect of appliqué work Several good examples are exhibited, also embossed thick paper in imitation of old leather, and which produces similar effect.

The late Mr. Pugin, Owen Jones, and others, have raised paperhangings to a pre-eminence here. Any person with good taste may easily select patterns appropriate to every kind of room. I think our manufacturers are not behind any country in this particular. We must now educate the working men, get them to study nature; and those who set the working patterns should remember the lines in Thomson's "Spring":—

——"Who can paint like nature?
Can imagination boast,
Amid his gay creation form like these?
And can he mix them with that matchless skill,
And lay them on so delicately fine,
And lose them in each other, as appears
In every bud that blows?"

Look at the beautiful colouring of nature, so bright, so bold, so sensitively soft, so freely distributed, yet charmingly adjusted; the groundwork, always judicious in tint, heightens the lustre of all above it. Look at the beautiful tints upon the rocks. Every shade of gray and golden green, red, purple, and black; beautiful heather, and shining golden gorse; blue and gray marl; a mingling of such gorgeous colour that cannot be surpassed.

Mr. Crace arranged his idea of harmonious colouring for a certain occasion in the following manner (and he will, I am sure, pardon me for mentioning it here, for they should be put up in every workshop, as references):—

1. Black and warm brown.
2. Violet and pale green.
3. Violet and light rose-colour.
4. Deep blue and golden brown.
5. Chocolate and bright brown.
6. Deep red and gray.
7. Marone and warm green.
8. Deep blue and pink.
9. Chocolate and pea green.
10. Marone and deep blue.
11. Claret and buff
12. Black and warm green.

Our rooms should always be bright and cheerful; they should never be painted or papered dark or dull. The climate is mild but changeable, and so much of the year dull and cold that we should always remember it when choosing our colour for their decoration.

WINDOWS.

Windows are the subject of our next division. As it is of the greatest importance in most houses that they should be easily opened, they should be lightly ornamented with drapery; instead of covering up half the window, as it often does, it should be so arranged that the air and ventilation should not be interfered with.

A window glazed with ground glass is almost always unsatisfactory. The vitrified surface being removed, the smoke and dust discolours it, and makes it difficult to be kept clean. White enamelled glass, having a semi-opaque figure upon a transparent ground, is more satisfactory. If the windows of a dining-room were filled with clear light pink glass, the effect of the room would always be pleasant and comfortable. The greatest care should be taken to avoid introducing dark colours, unless in the top or bottom division of the window, where heraldic devices and armorial bearings will look well, and greatly enrich the appearance of the room.

The art of painting glass is one of the most simple; it only requires a good draughtsman, and a good taste for arrangement of colour, for the best windows are those where glass is used which has been coloured in the manufacture. The glass requires to be carefully outlined and shaded by one process or another, according to the method of the painter, which, when leaded and finished, cannot be surpassed for effect. There is as much difference between real coloured glass windows and enamel painted windows as there is between real gems and paste stones.

The Munich painted glass at Peterhouse, Cambridge, which cost £5 per foot, looks very beautiful. I remember the pleasing effect of the windows representing "Peter and John at the Beautiful Gate." The door is represented partly open, showing the lamps, which are lighted; and as the sun was shining through the glass, it had the exact effect of the flicker of the flame.

When glass is stained by enamel colour, it must in time wear off the vitrified surface. One of the beautiful windows at Mr. Beresford Hope's church, at Kildown, in Kent, is spoiled in consequence of some of the colour peeling off; and the whole of the windows I have seen painted in enamel, although soft and beautiful, appear like the best kind of transparent pictures painted upon silk.

I have two or three pieces of old glass, which were originally in a chapel at Islington, which was stained on the surface, and much of it is obliterated. In the staircase at Apothecaries' Hall, Blackfriars, there are two or three parts of windows where the colours are entirely lost, in several places the yellow stain and the brown shadows alone remaining.

Flemish windows, although coarse in comparison, present the effect of the brightest, richest, sparkling gems. In the windows of the chapel at Hatfield-house the colours are as bright as emeralds, sapphires, and rubies.

I fear to exhaust your patience if more is said at present about stained glass, as it is so intimately connected with church decoration, which is well worth an evening's consideration alone.

The window cornices and curtains should always be light and elegant, the material being of the least consequence, sometimes velvet and lace, sometimes brocade or damask, and sometimes chintz. Fringes and tassels cannot be too light and fanciful, and seldom too often repeated. The old netted tassels, made of an infinite number of tufts and knots, looks much better than a large wood top, covered with silk threads and bullion fringe ends, of the present fashion. A careful, clever upholsterer, with good taste, having a fringed valance, a few yards of cord, and a dozen tassels, can make almost any window look elegant.

Where there are two or more windows in the side of a room, by all means put silvered plate-glass just above the floor to the level of the lath of the window cornice. It is the most effective ornamentation. In small square rooms narrow glasses set across the angles of the room increase the effect of the windows greatly.

FLOORS.

Time would fail me to tell you of the various ways in which floors are decorated. Since the days of Queen Elizabeth we have certainly advanced, for the floor was covered with rushes, rather an inconvenient mode of decoration we should think now. The incised marble of the 14th century, in which the pattern is drilled and cut out with a chisel, and then filled in with lead, we may see restored, in some degree, in the new floor of the Guildhall. The beautiful inlaid marble and mosaic round the shrine of S. Thomas à Becket is still partly to be seen at Canterbury Cathedral. The cold, comfortless effect of the combination of white and black squares, or lozenges of marble, is still in many an entrance hall, and in churches and public buildings. The revived manufacture of encaustic tiles has given an appearance of warmth and finished effect to hundreds of chancels in new and old churches, and when the patterns are well chosen, and not too often repeated, they have very good effect. A few good patterns are preserved at Tintern Abbey, many at Malvern, a few at S. Alban's and elsewhere, but the new ones are perfectly correct, and, as far as the manufacture of them is concerned, they appear better than the originals.

Wood floors, laid in geometrical patterns and polished with wax, look very well, but I think nothing looks better or feels more comfortable than an Eastern-pattern carpet, laid in the middle of the floor, with a parquet bordering round the rest part of the room. Carpets should never be cut into all sorts of shapes for the edges to fit close to the skirting; it wastes material, and is a great cause of the accumulation of dirt and dust. When parquet is not used, the floor can be stained and wax-polished, and the effect is very good. Care should be taken in choosing the carpet to have suitable colours, and a proper flat horizontal pattern. It is rather astonishing to see such absurd carpet patterns continually, when so much has been said about them. Some manufacturers give us for a hearthrug a border of natural flowers with a lion in the centre. Who would put their baby on it, I should like to know? Another would give us a brace of pointers; another, a design of water lilies, and imitation of real water! Think of sitting near the dining-room fire with your feet in cold water! The carpets are sometimes a floral ground with sprigs of roses, shaded like life with stems and leaves, thorns and all! I have not yet seen thistles and nettles designed for carpets, but I do not despair. We often see imitation ribbon tied in true lover's knots, and bows, and ends, which are suggestive of catching one's toes and tripping up; sometimes imitation mouldings in high relief, formed in lozenges, squares, and panelling, like an inverted oak ceiling, really painful and apparently hazardous to walk on. The patterns of most of the Turkey carpets, the Scinde rugs, and Persian carpets, are the very best, because suitable for their position. They would only look like carpeting, place them where you may. Our carpets may be strained over a ceiling for panelling, and many patterns, being vertical, would suit a wall. But it is not so with an Eastern carpet; it is a carpet, and you could not use it for anything else. The small squares of the most beautiful colours will not suffer in imagination by being stepped on; they seem solid, and designed for the purpose; but who would willingly step on natural roses or bunches of ribbon? The carpet before you is a good specimen of a Persian pattern, woven as an English Axminster in one piece, bordered to suit the room. Carpets should always be rich in colour, bright in effect, and gem-like in pattern. Where these things are remembered, and the articles manufactured are exhibited in good windows, buyers will purchase them, if their taste is directed a little by the seller.

We must educate the working classes, that they may be not only working men, as too many of them are, but workmen. Get them to study nature, observe her beauty, think, take interest in the cost of producing their work as well as in its finish. I think it is better for a government to assist in providing scientific education of every kind, that men may be skilful in their work, that orders may not be sent to foreign markets for manufacture, than for them to allow the working classes to be listless and indifferent to the ruin of commerce, reducing the quantity of labour, which causes poverty and distress, and ultimately to provide funds for their emigration. It is making matters worse by allowing the sinews and strength of the country to pass away. Professor Ruskin tells us ("Taste," page 174) "It is nothing to give food and medicine to the workman who has broken his arm, or the decrepid woman wasting in sickness," it is an every-day duty. "But it is something to use your time and strength to war with the waywardness and thoughtlessness of mankind, to keep the erring workman in your employ until you have made him an unerring one." I think these words, which are full of truth, will equally apply to government as to individuals, and if you are more actively assisting and increasing the number of those who take great interest in technical education, which will, I believe, cause workmen, employers, and patrons to be a mutual assistance and comfort to each other, I shall be quite pleased at the reception of my paper upon Surface Decoration.

STABLES, FARM BUILDINGS, &c.

THE stables of which we give an illustration this week were erected at Bishopgate House, Egham, for R. J. Ashton, Esq., and form, together with the farm buildings recently erected for the same gentleman, a model establishment, with all the recent improvements.

The buildings are faced with white Suffolk bricks, with Bath stone dressings, the string-courses being of moulded white bricks. The whole of the internal and external woodwork is of deal, stained and varnished. Adamantine paving is used inside the stable and under the glass covered ways, and Staffordshire paving in the yard. The covered ways are constructed of iron and glass. The farm buildings and enclosures are erected in keeping with the stables.

The buildings were erected from the designs and under the superintendence of Mr. Rawlinson Parkinson, architect, and the builder was Mr. A. Simpson, of Egham.

METROPOLITAN RAILWAYS.

THE House of Commons Committee appointed to consider the bills classed as Group No. 1, resumed their sitting on Tuesday. Evidence on behalf of the Board of Works, in opposition to the extension to the Mansion-house, was given. Mr. Corrie, the City Remembrancer, addressed the committee on the part of the Commissioners of Sewers against the proposed extension. Mr. Denison, Q.C., having replied on both bills, the room was cleared, and on the readmission of the public the chairman said the committee considered the preambles of both bills proved. The Metropolitan line must go to Aldgate without any further extension of time, and the station must either be made on the south side of Aldgate, or there must be a subway below the street for the accommodation of the public. In the Metropolitan district extension to the Mansion-house the proposed opening in the middle of the new street must be made to the satisfaction of some public or corporate body to be named in the bill, the fenced portion to be so made as not to interfere with the light of the adjacent buildings. There must be a station at Bread-street, as well as at the Mansion-house. The Metropolitan District Company must satisfy the Board of Trade that they have raised the necessary capital before they break ground, and the period at which the line is to be made must be fixed at July 1, 1871. There must be a condition in both bills that every facility should be offered to any new company hereafter formed for the completion of the inner circle, as originally sanctioned by Parliament, and there must be a clause introduced in both bills as to the use of the stations at Bread-street and Aldgate by the new company, and that, generally, every facility shall be given to them as to the traffic of the inner circle.

BOOKS RECEIVED.

MESSRS. LETTS, SON, & Co., have forwarded sets of their "Sectional" drawing and tracing papers and note books. They are prepared at cheap rates, and will be found very handy by architects, surveyors, and clerks of works for drawing rough plans. The lines are so ruled as not to show objectionably through the work. The note books, which are ruled in ¼in. squares, can be had either with or without metal rims, and at prices equally as cheap as the tracing papers.—*The Appropriation of the Railways by the State*, published by Cassell, Petter, and Galpin, is a popular statement by Mr. A. J. Williams, of the Inner Temple, in favour of the appropriation of railways by the State. It is a simple and intelligible statement in favour of his plan, to a certain extent supported by examples from foreign lines.—*Protection to Native Industry* (Stanford, Charing-cross) is an attempt by Sir Edward Sullivan to persuade the Government to tax heavily intoxicating liquors, apparently as a means of maintaining the "balance of trade," whatever that may be. It is with some satisfaction that we can legitimately excuse ourselves from reading this book.—Hardwicke's four handy little shilling volumes, *Peerage*, *Baronetage*, *Knightage* and *Commons*, deserve a repetition of the welcome we have always given them. The Baronetage and Knightage are especially valuable since the numerous additions lately made to those orders, in preventing us from offending the newly created and in many cases little known dignitaries by neglect of their titles.

COMPETITIONS.

CARDIFF UNION NEW WORKHOUSE.—In January last, thirteen architects sent in designs for the proposed new workhouse at Cardiff. We understand that Mr. T. E. Knightley, of London, has examined and reported upon the various designs, by the request of the guardians, and that they will consider his report at their next meeting.

THORNTON.—In a limited competition, the designs submitted by Mr. Geo. Smith, architect, of Bradford and Keighley, have been accepted by the committee for the proposed new Mechanics' Institute and Working Men's Club, Thornton. The building comprises a reading-room, 22ft. by 20ft.; refreshment-room, 22ft. by 20ft.; library, 19ft. by 18ft.; and curator's house, on ground floor; and two class-rooms and conversation-room on first floor. A lecture-hall will be placed in the rear, capable of seating 500 persons. The estimated cost is about £2200, but it is intended to leave the lecture-hall out of the scheme at present, and proceed with the rooms most urgently required.

THE MASON STATUE, BIRMINGHAM.—The Town Council of Birmingham, having resolved to erect a statue of Mr. Josiah Mason, in recognition of his munificence in founding the Erdington Orphanage and other works of benevolence in connection with the town, selected thirteen sculptors to compete for the execution of the work, which, as the printed instructions drawn up for their guidance states, is to be entirely of Carrara marble, and is intended to be placed in some public building. Its size and treatment was left to their judgment, the only condition prescribed under the last mentioned head being that the figures of three children should be introduced as accessories. It was, however, required that the models or sketches of the principal figure should not exceed 2ft. 6in. in height, and that every design should be sent in, not later than March 15, together with an estimate of the cost of carrying it out, and its delivery in Birmingham. These instructions were only dated January 17, and it is probable that the shortness of time allowed prevented many to whom they were addressed from competing. The invitation was declined by Mr. J. H. Foley, R.A., Joseph Durham, A.R.A., Mr. Alexander Munro, Mr. Mark Noble, Mr. Evan Thomas, Mr. W. Theed, and Mr. Thorneycroft. It was accepted by Mr. Peter Hollins, Mr. F. Junck, Mr. E. G. Papworth, jun., Mr. J. B. Phillip, Mr. F. J. Williamson, and Mr. Marshall Wood, all of whom have sent in designs, which during the past week have been on view at the Corporation Art Gallery, Ratcliff-place. The award has not yet been made.

PARLIAMENTARY NOTES.

WORKMEN'S INTERNATIONAL EXHIBITION.—Mr. H. Palmer on the 24th ult., asked the Secretary of State for the Home Department whether it was the intention of the Government to introduce a Bill (similar to "The Protection of Inventions Act, 1851"), to give protection to persons exhibiting new inventions at the forthcoming Workmen's International Exhibition.—Mr. Bruce said a bill of that kind will be shortly introduced by his hon. friend the Secretary of the Board of Trade.

THE MOSAIC DECORATIONS OF THE CENTRAL HALL.—Colonel Sykes asked the First Commissioner of Works, on Friday last, whether the Government had ordered more mosaic pictures for the Central Hall; whether they were in that advanced state of completion that one or more may or will be put into position during the Easter recess; and whether, if so placed, care will be taken to throw sufficient light upon them to enable members of Parliament and the public to appreciate their design and execution.—Mr. Ayrton said there was great difference of opinion as to the effect of the mosaic picture now placed in the Central Hall; some thinking it extremely beautiful, while others had an exactly opposite opinion. Under these circumstances a great deal of consideration would be required before any further expenditure was incurred, and the House should have an opportunity of expressing its own opinion before any further works were undertaken. Mr. Poynter was at present engaged in painting another compartment, but no further works had been ordered.

CITY IMPROVEMENTS.—The City Commissioners of Sewers, at their meeting on Tuesday last, decided upon taking steps to acquire the houses 78, 80, and 81, Queen-street, Cheapside, the leases of which are about to expire, in order to set them back and widen the street. The necessity for widening this the direct approach to Southwark Bridge from Cheapside, cannot but be increasingly felt when Queen Victoria-street comes to be opened in its entire length from Blackfriars Bridge to the Mansion House, and we are glad to see that steps (though gradual ones), are being taken to effect this desirable improvement.—The houses between Moor-lane and Type-street, Chiswell-street, will soon be removed, and the new direct north road, from the City to Islington and Hoxton (*via* Bunhill-row and Shepherdess-walk, City-road) will thus be completed. The claims for compensation in respect of these premises have been sent in, and are in course of settlement. The costs, estimated at £6500) will be borne by the City Commissioners of Sewers.

Building Intelligence.

CHURCHES AND CHAPELS.

BIRMINGHAM.—The foundation stone of a new church at Selly Hill, Birmingham, was laid on Wednesday last. Messrs. Martin and Chamberlain, of Birmingham, are the architects.

BRAMSHAW.—The parish church of Bramshaw, Wilts, is about to be restored and repewed, at an estimated cost of £600. Accommodation will be provided for 287 adults, and 76 children. The church contains two very unsightly galleries, but it is not proposed to remove them, although they cannot do otherwise than spoil the effect of the restoration.

BRIDLINGTON QUAY.—On Monday the foundation stone of a new church, dedicated to the Holy Trinity, was laid at Bridlington Quay. The church will consist of nave, chancel, tower, vestry, and north aisle; the space for the south aisle is left for further extension. The length of nave 87ft., and breadth 33ft. North aisle 17ft. 3in. by 64ft., and the base of the tower 24ft. square; chancel 36ft. long, and 30ft. wide; vestry 25ft. long by 18ft. wide. The building is calculated to hold 500 people. Its cost will probably be about £4000, and the building is to be completed early in the next year. The style will be Gothic, of the twelfth century.

EAST END.—On Thursday week the memorial stone of a new Wesleyan Chapel was laid at East End, Middlesex. Mr. J. Willey is the architect, and Messrs. T. Niblett and Son, of Hornsey Rise, the builders. The cost is about £1000, and the building will comfortably seat about 250 persons, the school, which forms a transept to the chapel, will seat about eighty more. The building is in the early English Gothic style.

WESTWARD HO.—The new church, dedicated to the Holy Trinity, which has been in course of erection for the last eighteen months, was opened by the Bishop of Exeter last week. It is in the Early Pointed style, and in plan consists of a nave 60ft. by 20ft., chancel 32ft. by 18ft., chancel aisle 19ft. by 9ft., north and south aisles 60ft. by 9ft., organ chamber 10ft. by 9ft., vestry on north side of chancel, south porch and western narthex 20ft. by 7ft., the height from nave floor to ridge of roof being 40ft. Situated but 100 yards from the famous Pebble Ridge, and exposed during the winter months to rough weather, strength and solidity have been the aim of the architect in the construction of the church. The external dressings are of Lundy Isle granite, with some few exceptions, where Marwood and Forest-of-Dean stone have been used for contrast in colour. There is a bell turret, 18ft. high, with two bells over the chancel arch. The dressings of the interior are of Bath stone, and the plaster is finished deep red with good effect. The nave roof is of deal, and that over the chancel pitch pine. The stone for facing all the plain masonry of the exterior was taken from the Kenwith Quarries. All the works have been completed by Mr. J. C. Tremear, builder, Bideford, from the plans and under the superintendence of the architect, Mr. W. C. Oliver, 19, Cross-street, Barnstaple. The carving was executed by Mr. Harry Hems. The cost of the works will be about £1700. The nave will be provided with chairs, and will seat about 400 persons.

BUILDINGS.

PARIS.—The new Hôtel-Dieu, Paris, is, after a pause, again being proceeded with. Within the last few days, conspicuous progress has been made with the windows, floors, and roofs. As soon as that portion of the new hospital which fronts the Rue Saint Christophe is finished, the old buildings on the west and south-west of Nôtre Dame will be demolished. There will then be a fine open space, bounded on the east by the portico of the cathedral; on the west by the Rue de la Cité and the grand new barracks of the Garde de Paris; on the south by the Saint-Michel branch of the Seine; and on the north by the new Hôtel-Dieu. The new hospital will provide for 700 beds. It will cost £600,000, exclusive of furniture and fittings.

RAMSGATE.—The foundation stone of a new wing to S. Augustine's (R.C.) College, West Cliff, Ramsgate, was laid a few days ago. The new wing will contain a spacious play-room, two large dormitories, lavatory, study-hall, &c., the roof being utilised as a "belle-vue," a covered promenade 100ft. long, which will

afford a splendid sea view. The cost will be £3500. Mr. E. Welby Pugin is the architect, Mr. J. Knight Morley being the contractor.

Royal Italian Opera, Drury Lane.—The auditorium of "Old Drury" is about to undergo a complete transformation, to adapt it for the requirements of the new Opera Company, which, under the able direction of Mr. George Wood and his powerful company, will be no mean rival to the Mapleson-Gye company at Covent Garden. Plans and drawings have been prepared by Messrs. Marsh, Nelson and W. Harvey, architects, and the whole works placed in the hands of Messrs. W. Bracher and Son, who remodelled the house, under the same architects, for Mr. Mapleson, in the short space of five days, after the destruction of Her Majesty's Theatre, 1868.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

Received.—J. H. W. B.—Thomas Ayres.—Houblon.—E. R.—E. Weston.—Geo. E Davis.—Edwin Baker.—D. T. and F.—J. D. M.—W. N. F.—W. E. G.—H. J. A.—P. and Sons.—E. J. C.—T. E. K.—W. J. S.—J. R.—A. W.—Jos. Oswald (too late).

W. W. has written us a long letter, advocating the anonymous system of correspondence. We say, let any one write as he thinks proper. This has been our plan from the commencement. If a contributor or a correspondent likes to put his name to what he writes, he is at liberty to do so. W. W. prefers to put his initials merely, another puts his name in full, or uses some *nom de plume*. Let each one follow his own inclination.

Correspondence.

EXTERNAL FACINGS AND DRESSINGS.

(To the Editor of The Building News.)

Sir,—Your article on the above subject suggests the question, "Why cannot we get rough-glazed white or red bricks, as well as black ones?" It is chiefly their vitrified surface which makes the latter smoke and dirt-proof (as at Lambeth Palace), and for use in patterns the former colours would often be preferable but for their deficiency in this respect. Perhaps some brick-maker may take the hint.

As to Portland cement, we all know that it need not be an imitation of stone; and we all know, too, that in this country it almost invariably is. If we used it as plaster was used by the Saracenic builders, or even as it is used by the Turks to this day, it might be defensible architecturally. But, in any case, a facing material more thoroughly unfit for a smoky town can, I think, hardly be conceived. What can be more dismal and depressing than the dingy drab which cement acquires after a year or two in London, or what can be more raw and monotonous than its surface if painted? Dressings of a lighter coloured brick than the general facing would probably be far preferable to it on every ground, especially if, as I have suggested, these light bricks could be rough glazed or partially vitrified on the surface.—I am, Sir, &c., J. C.

I see white glazed bricks are advertised for sale, but these appear to be those with a smooth enamelled surface like Dutch tiles. What we want is a less shiny glaze.

ARCHITECTURE AT THE BIRMINGHAM SPRING EXHIBITION.

Sir,—As you are perhaps aware, we have now two exhibitions in the year at Birmingham. The Spring one has just commenced, and appears a very good one; Turner, Cattermole, Callcott, Harding, Prout, and other eminent artists are well represented, and the local artists have likewise done very well. There is also an attempt at architectural drawings, but it is a feeble one. Four designs only are sent, and they certainly do not hold a very high rank. Mr. Bindley sends his design for West Bromwich Schools, but it is very poor Elizabethan, and makes one wonder how he came to obtain the job. Mr. F. S. Proud's design for cottages is a superior production altogether, and is a very pleasing specimen of domestic Gothic, showing how a good effect may be gained by simple means. Mr. J. S. Davis's reredos is a flaming piece of composition. He cannot be complimented on any great success, though there are indications that he might do better were he to take more pains; he has some idea of colour, but his figure drawing is defective. I should certainly advise him to study figure drawing for some time. His cathedral front is tame and commonplace. I fancy it would be a good thing if some local architect would deliver a course of lectures on architecture. I do not see why that art should be neglected, and so many architects, too, in Birmingham.—I am, Sir, &c. T. G.

Birmingham Heath.

Intercommunication.

QUESTIONS.

[1817.]—BUILDERS' PRICES.—Could any of your readers oblige by answering the following: What is a fair profit beyond the actual cost to builder for work in a new building of average magnitude? Are prices increased when work consists only of reparation of dilapidations; if so, to what extent? Is it usual in charging day work to make an item of cartage from builder's yard, or should this be comprehended in allowance for materials?—Æ.

[1818.]—STRENGTH OF IRON GIRDERS, &c.—Will some of your readers give me the following information? I am wanting a good practical work on the strength of iron girders, columns, &c.; also one on joiners' and carpenters' work. What would be the most suitable, and where could I get them?—W. W.

[1819.]—INTERFERENCE WITH CLERK OF WORKS.—Will some of our practical and experienced men kindly inform me, is it right or legal for any architect to cancel the orders of a clerk of works or send drawings and instructions to a contractor or his foreman as long as an architect acknowledges he has such a one on the works, providing the said clerk of works keep within the limits of the said drawings, specifications and contract agreements signed by the said architect and contractor?—Pupil.

[1820.]—BORING TOOLS.—Will any of your readers kindly inform me whether there is yet manufactured any simple boring instrument which architects could carry in their hands the same as a level staff or 5ft. rule?—and what are the best, nicest, and simplest methods generally in use for boring to discover the nature of dry land and of land submerged by the sea or other deep water?—and also what book would give the clearest and most reliable advice as to the treatment of quicksands, morasses, and other difficult or dangerous foundations, and the liabilities and capabilities of all sorts of soils?—Vectis.

[1821.]—ARCHED RIBS.—I should like to ask the writer of the above article in your last number why the Derby market hall roof is deeper than the King's Cross roof, both lately described in The Building News? Derby market hall, span, 86′ 6″; depth of rib, 2′ 4″. King's Cross roof, span, 105′; depth of rib, 2′. Why is the smaller span the greater depth? I have noticed the Paddington Great Western roof, but no writer on arched roofs mentions it; also the same with the roof of the Agricultural Hall. I shall be greatly obliged if you will please notice this in your queries.—A Pupil.

[1822.]—HOW TO DESTROY BUGS.—I should be exceedingly obliged to any of your correspondents who will kindly tell me of an effectual and inexpensive way of exterminating bugs from the walls of a house. I have a special horror of these creatures, but have, I fear, "let myself in for them" in the house I have lately taken. The rooms were stoved before the furniture was put into them, by way of precaution, and since then the vermin have made their appearance. I have saturated all crevices with oil of tar; this keeps them pretty well under, but is not quite effectual. I have been told that camphor will answer the purpose, but my experience—happily not very great—leads me to say it is of little use. I find all the silver in the house tarnishes. Can your correspondents also inform me if it is likely to be the oil of tar that does it?—A Tender-Skinned Individual.

REPLIES.

[1792.]—MOUNTING LARGE MAPS.—There is no difficulty in mounting the map "R. N. O." speaks of, only he must exercise care, skill, and patience, the last especially. I may observe that if he imagines he can join a single pair of ordnance maps together so that all the corresponding lines should fit exactly, he cannot know much about them. If he gets the main roads to join tolerably accurately he may consider himself lucky. Now for the mounting. As to having a sewn seam, the idea is absurd. The way to manage is to join the cloth at the same time that the mounting is done, by the same adhesive material, which is usually a strong paste. If he could possibly "feather-edge" the cloth at the joints it would make a capital job, but this, I fancy, although an easy operation with thick paper, could hardly be done with cloth. It might, however, be possible to thin the joint in some way or other. The joints of the maps themselves must be "feather-edged," or they will be clumsy.—S. S. L.

[1793.]—DISTRAINT FOR RENT.—If a lodger has reason to suppose that his goods and chattels are likely to be seized to satisfy a landlord's claims, he should apply for an order of protection, but otherwise anything (with certain exceptions) that is on the premises can be seized in distraint.—Clerk.

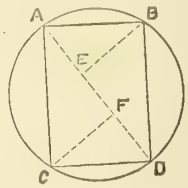
[1797.]—DIMINISHING POINTS.—There are two errors made in my answer to the above, which, if not explained, may greatly mislead. Point A is omitted, which should be placed on the cone of rays perpendicular to the point of sight, P S. Again, instead of *join* the cone of rays, read *form* the cone, &c.—J. B.

[1801.]—VELOCITY OF WATER.—The readiest method of solving the question of "G. P." will be, first, to find the quantity of water or number of cubic feet flowing through the pipe in 1min., and the velocity will be easily got by dividing the quantity by the area of the pipe. Thus if C be the number of cubic feet passing through the pipe in 1min., V the velocity, and A the area of the pipe, then $V = \frac{C}{A}$. To find C we may use the following formula, in which D = diameter of pipe in inches, H = head of water in feet, and L = length of pipe also in feet, then $C = \frac{4{\cdot}72\ \sqrt{D^5}}{\sqrt{\frac{L}{H}}}$. Reducing this to the figures given by "G. P.," we get

$$C = \frac{4{\cdot}72 \times 277{\cdot}6}{26{\cdot}53}$$

Solving the fraction C = 49·7 cube feet per minute, or 312 gallons in round numbers. Since the area of the pipe is equal to $\frac{\pi \times D^2}{4}$, putting for D its value of 6in., we have A = 0·2 square feet. From the equation above $V = \frac{C}{A}$, the velocity is equal to 248·5ft. per minute.—Hydraulics.

[1802.]—VARIOUS QUESTIONS.—As I see that none of your contributors to Intercommunication have replied to "X. T. C.," perhaps you will allow me to do so. To obtain the best form of beam from a round piece of timber, we proceed as follows:—In the annexed cut, let the circle represent the timber, and A D any diameter. Divide A D into three parts in E and F, draw E B and F C perpendicular to A D, and where they touch the circle draw the lines A B, C D. The best form of beam will be represented by the figure A B C D. The proportion of the depth to the width is given by the formula $D = \sqrt{2\ B^2}$. In words, square the width of the beam, multiply it by 2, and extract the square root; the result will be the depth of the beam. In reply to the second question, a lime is produced by the burning in a kiln of either a limestone or chalk. A cement is an artificial combination of chalk and clay. The best Portland cements contain from 67 to 75 per cent. of chalk, and from 25 to 35 of clay, according to the quality. For a chimney about 100ft. in height, if built square, 1in. in 10ft. is a batter often used. There is no rule about the footings.—Spes.



[1806.]—PRESERVATION OF RED FACING BRICKS.—Our patent process effectually prevents the change in appearance as mentioned by "F. N.," at the same time effectually waterproofing walls thus treated.—R. Gay & Co., Alton, Hants.

[1808.]—LEGAL.—You will certainly have to pay. The Local Board has discretionary powers, and may, if it chooses, allow a departure from the bye-laws. Besides, it is quite possible that the building may have been where it is before the constitution of the Board. In this case you would be still worse off, as its powers are not retrospective.—A. L.

STATUES, MEMORIALS, &c.

Harrow.—The Messrs. Leighton, of artistic reputation, have erected a monolithic family monument in the churchyard of Harrow. It was executed at the works of Messrs. Newall, of Dalbeattie, near Dumfries. The three gables it was intended to decorate with painted *faience*, though now it is thought mosaic would be more durable. Thus the work, according to the *Guardian*, will be rendered either at the Vatican works in Rome or in Venice.

WATER SUPPLY AND SANITARY MATTERS.

Hawick.—Her Majesty's Commissioners for inquiring into the best means of remedying the pollution of rivers inland, commenced, on Tuesday last, an inspection of the basin of the river Tweed and its tributaries, and also of the river Irvine. Provost Fraser has received intimation from their secretary that they will be at Hawick on Friday (to-day), and requesting that the Provost, the members of Council, the Town-Clerk, the Medical Officer of Health, and the Burgh Surveyor, will meet them in the Council Chambers at noon.

Bridport.—We are informed that an engineer from Birmingham, and a contractor from Preston, Lancashire, are now engaged in a survey of the district previous to the formation of a company for supplying the town with water.

LAND AND BUILDING SOCIETIES.

Exeter Building and Freehold Land Society.—The thirteenth annual meeting of this society was held at the Athenæum on Tuesday week. The report expressed satisfaction that the business transactions of the society had exceeded this year that of any previous year. The total receipts in the year amounted to £11,816 6s. 8d., being an increase of £1470 13s. 4d. The sum due from borrowing members amounted to £16,001 15s. 9d., being an increase of £3216 6s. 2d. The amount due to investing shareholders was £19,056 10s. 1d., being an increase of £2262 2s. 5d. The net profit realised, after defraying all expenses of management, was £927 15s. 6d., out of which the committee recommended the adding of 5 per cent. per annum to the accounts of shareholders, and to carry on a sum of £80 to the current year's account. The number of members on the register is 863, holding 1339 shares. The sum of £4018 had this year been lent on security of houses and land, being an increase on the previous year of £100.

People's Co-operative Benefit Building Society (Greenwich).—The twenty-second annual report, like its predecessors, records continued progress. The capital of the

Society, after deducting the loans due to the bankers (£3500), now amounts to £43.839, being an increase during the year of £3186. Although distress and commercial depression has prevailed to an unusual extent, yet the society continues to prosper—a proof of the soundness of its principles and the co-operation of its members, who, by their individual and collective efforts, have succeeded in maintaining the efficiency of the Society.

LEGAL.

A District Surveyor at Fault. — At Guildhall Police-court, on Thursday week, Mr. Polydore de Keyser, proprietor of the Royal Hotel, Chatham-place, New Bridge-street, Blackfriars, was summoned by the Commissioners of Sewers, before Mr. Alderman Stone, to show cause why he did not do certain works to his hotel, in order to make the building safe. For the defendant it was contended that the building was in no way dangerous, and that it was under the continual supervision of the surveyor of the Metropolitan Board of Works, the surveyor of Bridewell Hospital, and Mr. Gruning, surveyor for Mr. De Keyser. There was a crack, but it had been there for nine or ten years, and four years ago a fillet of cement had been run round the house, but during the whole of that time it had not settled one bit. These proceedings, it was contended, were malicious on the part of Mr, Power, the district surveyor, because Mr. De Keyser had complained against him to the Commissioners of Sewers. Mr. Alderman Stone stopped the case, and said he was satisfied that the building was not a dangerous structure. He dismissed the summons.

Pearson v. the Lambeth Vestry.—The action brought some time ago by Mr. Pearson, the contractor, against the Lambeth Vestry, claiming £1605 1s. 1d. for accidental damage done during the construction of sewer works in Camberwell-new-road, &c., during the floods, has been settled, Mr. Pearson accepting £530 16s. 6d. in satisfaction of his claims, and paying the costs incurred.

Our Office Table.

A New Safety Sash Fastener.—Messrs. Hobbs, Hart, and Co., have sent us for inspection a specimen of their newly invented patent sash fastener. Its object is to effectually frustrate all attempts of thieves to open a window by means of pushing the catch back with a knife slid between the bars from the outside. On examining the fastener, we have found that one-half of it has an underslip on its bed. When the halves of the fastener are placed on the sash bars, this underslip closes the seam, and effectually stops the passage of a knife or any other instrument passing between the sashes. The large catch has a locking bolt, completely locking each half of the fastener firmly together. There is no mistake about the value of this sash fastener, as it works easily, does its work effectually, and is, we hope, sold cheaply.

The Late George Cattermole, the Engraver.—A committee of gentlemen, consisting of W. P. Frith, R.A., William Evans, S. C. Hall, Edward Franks, and Tom Taylor, are exerting themselves to procure funds for a monument to the late George Cattermole, to be erected in the cemetery at Norwood, where he is buried.

Monster Blast of Freestone.—The opening of Garscube new freestone quarry, which is situated on Temple Farm, near Glasgow, took place on Saturday afternoon, when about 3000 tons of rock were lifted by a blast of eight bores, two feet deep, and charged with 30lbs. of powder each.

Opening of Museums on Week-day Evenings.—On Tuesday evening a meeting was held in the vestry-hall, Chelsea, to promote the opening of the British Museum and the National Gallery in the evenings. Mr. Walter Taylor occupied the chair. The first resolution, which expressed a hope that the Government would support Mr. W. S. Allen's motion for opening the national collections on three evenings in each week, from seven till ten o'clock, was moved by Mr. C. Hill, who said that 3,000,000 persons had visited the South Kensington Museum in the evenings in twelve years, and a Parliamentary committee, after full inquiry, has recommended the opening of the British Museum and the National Gallery on three evenings in each week from seven till ten o'clock. Mr. Dickson seconded the resolution, which was carried. Another motion, adopting a petition to Parliament, was moved by the Rev. Mr. Sugden, seconded by Mr. Prichard, and carried; after which a vote of thanks to the chairman brought the proceedings to a close.

Society for the Encouragement of the Fine Arts.—On Thursday week Mr. James Dafforne gave a lecture on "The Poetry of the Arts"—Mr. W. C. Hazlitt in the chair. The lecturer said that the poetical in art had for its object to interest the feelings by means of form and colour, by graceful and fitting words, so that, whilst satisfying the intelligence, it teemed with life and beauty. High art he had the greatest respect for, but greater for that true art which rendered the artist a connecting link between the living and the dead. After some remarks on Egyptian, Grecian, and Roman art, and on their slow progress towards maturity, Mr. Dafforne proceeded to show how Christianity had revolutionised art, noticing its revival on the establishment of the Papal throne, and the character impressed upon it by Cimabue and Giotto, Michael Angelo, Perugino, and Raffaelle. Next adverting to the poetry of the builder's art, with a passing tribute of respect to the labours of the old monkish artists, he eulogised the poetry of the pencil of Turner, Wilkie, and Martin, dwelling on the poetical sentiments evoked by "The Fighting Temeraire," "The Distraining for Rent," and "Belshazzar's Feast;" and he concluded a lecture, poetical as well in treatment as in subject, with some reflections on the intense thought and study required to produce a work of genius, and on the deep sense of gratitude that was due to the artist.

Chips.

The Poplar Board of Guardians took possession of the finished portions of the additions to their workhouse on Tuesday last. Mr. Morris is the architect.

The S. George's (Hanover-square) Committee of Works has resolved "That in future all tenders for works and other matters be sent in under seal."

It is proposed to erect an iron building in connection with the Taunton and Somerset Hospital, to be used as convalescent wards. The estimated cost is £2000.

The Salisbury Gas Company is about to reduce the price of its gas to 4s. 4½d. per thousand feet.

Mr. Arthur Kempe, surgeon, of Exeter, has offered to erect, at his own expense, a convalescent hospital in connection with the Devon and Exeter Hospital.

The block of buildings of which the Elephant and Castle, Newington, forms a part, has recently had its surrounding footpaths experimentally paved with asphalte, by the same process as that by which a portion of Threadneedle-street was, about three years since, laid with the material.

Two of the railway arches on the Chatham and Dover line at Camberwell have been fitted up, to serve the purpose of a Baptist chapel, by Mr. Parker, builder, of Stockwell.

A new wing is being added to the Morningside Asylum, Scotland. It is an extension of the present south-west wing, and will cost £4000.

THE TIMBER TRADE REVIEW.

PROSPECTS OF THE TIMBER TRADE AS REGARDS BUILDERS.

FOR many years the prospects of the timber trade have been anything but hopeful. Over-speculation culminated at last in the failure of eminent firms of bankers and of contractors, and others—all doubtless men of honour, but led away by that system of reckless advances which characterised the time, and which has resulted in the great number of unlet houses to be found in the outskirts of London. A much healthier state of things is now returning. The houses may remain yet unlet, but the inevitable law of supply and demand forbids reckless building, as it is self evident that no builder with capital would build unnecessary houses, to remain on his hands for years unlet, and the builder who depends on advances from his bankers knows what he generally has to expect. Trade thus having almost found its level, we may hope for the renewal of the good old times of wholesome trade.

The timber trade affects builders in a very great degree, and the trade is rectifying itself rapidly. The reckless imports of days gone by have been almost stopped, for low prices on importation have almost done their work—not quite, but *almost*.

What builders have to look out for in the present year is the gradual rise in the price of wood goods, as importers are certain to endeavour to raise prices.

Although a rise is inevitable, the time has not yet come, and probably will not come until autumn, and then we may look for a permanent advance. Builders therefore cannot do better than provide themselves with what they require at the current prices, for goods thus purchased will pay for keeping. Now that wood goods are duty free, no estimate only can be formed of the quantity imported, but competent judges say that their private statistics show that the imports are such as to justify an expectation of a certain rise in prices at some not remote date. The builder need not feel at all discouraged if this prove true, for by the laws of political economy, it means greater prosperity to him. Men who "scamp" will not have their usual opportunities (they always find *some* opportunities), and the honest, straightforward trader will be the gainer.

LATHWOOD.

Actual experiment on 1 fathom of 4ft. Petersburg lathwood, bought by auction at the rate of £6 7s. per fathom of 216 cubic feet, or equal to £4 4s. 8d. per fathom of 4ft. or 144 cubic feet.—The fathom of 4ft. was rended into 135 bundles of 400ft. each, and after adding 17s. 7d. per fathom of 4ft. for barging, labour, rending, &c. (a most liberal allowance), the cost per bundle was a fraction less than 1s., although 4ft lathwood is generally worse to rend than 6ft. and 8ft. The fractional difference spoken of would enable those who buy their own lathwood to rend to give a few more shillings per fathom of 6ft., with the same result.

THE LONDON LATH-RENDERS.

Have they ever considered that the bundles of laths imported from Gothenburg only contain 360 running feet, and do they know that they were originally intended for the Hull market?—or at least the habit of giving 360ft. to the bundle was incurred by the Swedish men first dealing with Hull merchants. The strong London lath will always be preferred to the Hull lath, and the imported lath, if the bundle is opened, is often a dismal spectacle. Builders want good stuff, and sometimes Hull laths, 360ft. to a bundle, and equal to those riven there, will do very well, and give satisfaction. Let London lath-renders see what good work the Hull men can turn out, and try to imitate it, and then they need not fear competition from the foreigner at present.

It is a positive fact that lathwood is imported into Hull, riven there, and again sent to London and sold at a profit. But the same lathwood can be imported into London at *less* than the Hull price, or to give the benefit of any doubt, at an *equal* price. Why then can we not compete with them?

RECENT TIMBER SALES.

There have been frequent sales of the timber used in the construction of the temporary Blackfriars Bridge, and there will probably be many more. The timber is all good Dantzic, of excellent quality, and has sold at from 6½d. to 8d. per cubic foot. This result is arrived at by cubing up the different lots, the timber being sold at so much per lot.

Messrs. Churchill and Sims' sale, at the Baltic Sale Room, Threadneedle-street, 30th March, was very numerously attended, and the biddings were more spirited than they have been of late. The prices realised were low, but it is probable that an improvement in this respect will take place before long. The following prices were obtained:—

Quebec, 12ft., 1st bright pine, £19 Petg. std.
Do. do., shorter lengths, £16 15s. to £17 5s.
Do., 2nd spruce, £14 5s. for 3 × 9.
Do., 3rd do., £12 10s., do.
Swartwick, 3rd yellow, 3 × 9, £9 Petg.
Do., 1st and 2nd do., 3 × 11, £11 10s.
Do., do., 3 × 9, £10 10s.
Husum, do., 4 × 9, £10.
Do., 3rd do., 3 × 9, £9.
Holmsund, do., 3 × 9, £8 15s. to £9.
Krageroe, 2nd do. 2½ × 6½, £7 15s.
Do., 3rd do., 2½ × 6½, £6 15s. to £7 5s.
Uleaborg, 1st and 2nd do., 1 × 9, £7 10s.
Riga crown, 3 × 9, white, £9.
Do., half crown, 3 × 9, do., £7 10s.
Archangel, 3rd, 3 × 11, yellow, £8 10s.
Do., 1st, 3 × 9, do., £13.
Gefle, 3rd, 3 × 9, do., £9.
Wyburg, 1st, 2½ × 7, do., £9 10s.
Do., do., 3 × 7, do., £8 5s.
Do., do., 2½ × 7, do., £8 10s.
Georgia pitch pine, £12 to £12 10s.
Sandarne, 3rd, 3 × 11, yellow, £9.
Do., do., 3 × 9, do., £9 5s.
Do., do., 3 × 8, do., £8 5s.
Do., do., 4 × 11, do., £9 15s.
Pugwash spruce, £10 15s. to £11 5s. for 3 × 9.
Metis, 1st spruce, £15 5s., do.
St. John's spruce, £13 to £13 15s. do.
Schien, 1st and 2nd, 3 × 9, white, £11 10s., Pet. std.

Wasa, 3 × 9, do., £6 15s. Pet. std.
Hudikswall, 3rd, 3 × 11, yellow, £7 5s.
Skepwik, do., 3 × 9, do., £8.
Jacobstadt, 1st, 3 × 11, £9 5s.
Fredrickstadt, 1 × 7, 1st yellow flooring, 11s. 6d. per square.
Do., 1 × 6½, do , 11s. do.
Do., ¼ × 7, do., 8s. 9d., do.
Do., ¼ × 7, 1st, white, 8s. 3d., do.
Do., ¼ × 6½, 1st, yellow, 8s. 6d. do.
Dram, ¼ × 6½, 1st, do., 6s. 6d. do.
Riga crown wainscot logs, 80s. per 18ft. cube
Birch, 50s. to 52s. 6d. per load.
Auckland, Kunrie pine, 2s. per cubic foot.
Do., do., 15 to 44in., 2s. 6d. do.
Dram yellow balks, 39s. per load.
Crown Danzig timber, 85s. do.
Best middling do., 80s. do.
Good middling do., 70s. do.
Common middling do., 41s. do.

MEETINGS FOR THE ENSUING WEEK.

Monday.—Institution of Surveyors. Paper on "A Plea for culture in the Profession of a Surveyor." By Mr. J. Matthews. 8.
" Entomological Society. 7.

Tuesday.—Institution of Civil Engineers. 1st, Discussion on the S. Pancras Station. 2nd, on the Dressing of Lead Ores. By Thomas Sopwith, jun., M.Inst. C.E. 8.
" Royal Institution. "Deductions from the Comparative Anatomy of the Nervous System." By Professor Rolleston, M.D., F.R.S. 3.

Wednesday.—Society of Arts. Adjourned discussion on Mr. W. Bridges Adams' paper on Tramways for Streets. 8.

Thursday.—Society for the Encouragement of the Fine Arts. Exhibition of Works of Art, contributed by members and others. A paper by Henry Tidey, Esq. on "Beauty and the Beautiful." 8.30.
" Society of Antiquaries. 8.30.
" Royal Institution. On the Chemistry of Vegetable Products. By Professor Odling, F.R.S. 3.

Friday.—Royal Institution. 9.

Saturday.—Royal Institution. "On the Sun." By Norman Lockyer, Esq., F.R.S. 3.

Trade News.

WAGES MOVEMENT.

The Nine Hours Movement in the Building Trade.—The adjourned meeting of delegates of the carpenters' and joiners' societies was held on Saturday at the Duke of York Tavern, York-street, Lambeth, in furtherance of the above movement. From the reports given in by the delegates it appeared that during the week large and influential meetings had taken place in various metropolitan districts, at all of which resolutions have been unanimously adopted, declaring the great benefit that would accrue to the trade, in its present depressed condition, from a reduction in the hours of labour, and also in favour of the new code of working rules to be mutually agreed upon between employers and workmen. Arrangements were then made for the holding of other district meetings. No day has yet been fixed upon for the great aggregate meeting of the trade. It was stated at the meeting that of the sixty joiners victimised at the firm of Messrs. Alldin for resisting a reduction in wages, all but twenty-nine had succeeded in obtaining employment. The men still unemployed were being well supported by the trade subscriptions.

TENDERS.

Beaumont.—For new chapel, refectory, and dormitory at S. Stanislaus College, Beaumont. Messrs. Jos. A. Hansom and Son, architects:—
Myers and Sons (accepted) £6904

Bermondsey.—For 25,000ft. of tram, for the Bermondsey Vestry:—
Booth (accepted) ..... 9½d. per foot.

Castle Donington.—For proposed mill and overlooker's home, Castle Donington, Leicestershire, being Contract No. 1. Mr. Bakewell, architect:—

Bell and Son, Nottingham	£1982	0	0
A. F. Whittome (Stafford)	1968	0	0
Wooll and Slight (Nottingham)	1960	0	0
Stevenson and Weston (Nottingham)	1939	11	6
George Johnson (Nottingham)	1932	0	0
Henry Vickers, Nottingham	1928	0	0
T. Wood and Son, Nottingham	1908	0	0
E. Marshall, New Lenton, near Nottingham	1888	13	0
J. E. Hall, Nottingham (accepted)	1880	0	0

Chertsey.—For House for Mr. Worthington. T. Wonnacott, architect:—

Knight and Sons, Chertsey	£2626
Simpson, Egham	2500
Nightingale, Lambeth	2405
Goddard and Son, Farnham	2370
Martin and Wells, Aldershot	2345

Croydon.—For the erection of dwelling-house and stabling. Chas. G. Searle and Son, architects:—

Myers and Sons	£3794
Patman and Fotheringham	3420
Macey	3379
Dove, Bros.	3345
Newman and Mann	3336
Colls and Sons	3329
Higgs	3296
Brass	3140
Ward	3095
Ellis	2961
Hollidge	2515
Pollard	2495

Deptford.—For building fire brigade station, Evelyn-road for the Metropolitan Board of Works:—

Harrop and Gould	£2439
Stocksbury	2152
Wittick	2100
Thompson	2065
Sharpington and Cole	1977
Nightingale	1962
Tongue	1949
Blackmore	1895
Crockett	1850
Harris and Edwards	1846
Foster	1845
Ball	1839
Crabb and Vaughan	1797
Knight	1698
Hughesdon	1689
Winship	1685
Hockley	1660
Atchinson and Walker	1645

Edmonton.—For building infectious ward at the Edmonton union. Mr. T. E. Knightley, architect. Quantities prepared by Messrs. Curtiss and John Edward Ormes:—

Sanson	£3472	10	
Howard	3125	0	
Crabb and Vaughan	3120	0	
Bentley	3036	0	
Withers	2950	0	
Sanders	2942	0	
Nightingale	2933	0	
L. and W. D. Patman	2829	0	
Eaton and Chapman	2785	0	
Wood	2750	0	
Winship	2750	0	
Pocock	2700	0	
Bayes and Ramage	2700	0	
Cook and Green	2693	0	
Linzell (accepted)	2497	0	
Johns	2285	0	

Garvel Park Graving Dock, Greenock.—We understand that Messrs Shearer, Smith, and Co., of the well-known Dalbeattie Granite Quarries, have been the successful competitors for the supply of the granite for this extensive dock, which we believe will be the first dock on the Clyde entirely constructed of granite.

High Wycombe.—For Villa residence. Arthur Vernon, Esq., architect:—

Goddin	£1455
Silver and Son	1446
Reavell	1350
Lacey	1300
Wood and Company	1299
Spicer	1290
Dover	1282
Loosely	1252
Woodbridge	1250
Ferguson	1237
Nightingale	1234
Cooper	1208

Hornsey Rise.—For the erection of the Aged Pilgrim's Asylum. Mr. F. Boreham, architect:—

Roberts	£11600
Perry and Co.	10148
Jackson and Shaw	9988
Williams and Son	9967
Higgs	9800
Ebbs	9640
Hill and Son (accepted)	9340

Hornsey.—For the formation of roads and sewers upon an estate, for the Right Honourable Earl Beauchamp. Messrs. Hammack and Lambert, surveyors:—

Newman and Mann	£11086
Capper	8999
Anderson and Son	8903
Abbott	8400

Kirkdale, near Liverpool.—For carpentry and joiners' work required to a building estate, for Capt. R. Holden. Troughton and Prescott, surveyors. Quantities supplied:—

Mullin	£433	0	0
Robinson	290	12	10
Elam	287	0	0
Greenwood	285	0	0

Lambeth.—For rebuilding the Pine Apple public-house and two houses adjoining, situate in Hercules-buildings, Lambeth. Mr. Lewis H. Isaacs, architect. Quantities supplied by Mr. L. C. Riddett:—

Patman and Fotheringham	£4915
Adamson and Sons	4653
Holland and Hannen	4624
Mansfield, Price, and Co.	4555
Phillips	4540
Axford	4529
Browne and Robinson	4356

S. Luke's.—For sheds at S. Luke's stone yard. Mr. H. Saxon Snell, architect:—

Bridgman and Nuthall	£123	0	
Pask	108	10	
Sabey and Son	106	0	
Ebbage	105	0	
Perry Bros.	103	0	
Smith (accepted)	95	10	

South Hackney.—For the erection of school buildings. Chas. G. Searle and Son, architects:—

Patman and Fotheringham	£875	0	0
Brass	865	0	0
Newman and Mann	836	0	0
Merritt and Ashby	795	0	0
Ennor	778	0	0
Dabbs	772	0	0
Higgs	764	0	0
Dean	723	17	1
Pavitt	684	0	0

Sydenham.—For residence at Rockhills, Sydenham, for R. Sutton, Esq. Mr. John F. Bentley, architect. Quantities by Mr. Wm. B. Catherwood:—

	Residence.	Boundary Wall.
Buck	£2140	£106
Keble	1998	121
Hookham	1869	138
Manley and Rogers	1837	110
Cooke and Co. (accepted)	1730	81

COMPETITION.

Bradford Abattoir Company, Limited.—Extension of time to 2nd May.—Plans, &c., of a slaughter-house, cattle sheds, and all necessary appurtenances to a slaughter-house proposed to be built at Bolton Bridge; also plans for an hotel and outbuildings, adjoining to Bolton-road, and near to the proposed slaughter-house. The directors will give £20 for the best, and £10 for the second best set of plans. Messrs. Dixon and Hindle, Land Agents, &c., Kirkgate, Bradford.

Manchester, May 30.—For abattoirs and a carcase market. The following premiums will be awarded:—One of £150, one of £100, and one of £75. Joseph Heron, Town Clerk, Town Hall, Manchester.

CONTRACTS OPEN FOR BUILDING ESTIMATES.

Worle Church, Somerset, April 11.—For the general restoration and re-seating of the parish church of Worle, near Weston-Super-Mare. John Norton, Esq., Architect, 24, Old Bond-street, London, W.

Wootton-Bassett, April 4.—For the erection of two mortuary chapels and curator's house, &c. Thomas Lansdown, Architect, Swindon.

Wandsworth, April 7.—For the completion of two villas, situate in the Merton-road. Jas. Prentice, secretary, 378, City-road, London.

Pentonville, April 6.—For the supply of building materials at Her Majesty's Convict Prison, Pentonville. The Surveyor General of Prisons, 44, Parliament-street.

Midland Railway, April 5.—For the erection of an engine shed for twenty-four engines at Peterborough. James Williams, secretary, Derby.

Midland Railway, April 5.—For the erection of stores for lost property and workshops at Derby. James Williams, Secretary, Derby.

Fawsley, April 11.—For the erection of farm buildings, on the Fawsley Estate, Northamptonshire. Mr. Waters, Estate Office, Fawsley, near Daventry.

Southend Local Board of Health, April 4th.—For the main drainage of their district. William Gregson, jun., clerk.

Farnham and Hartley Wintney District Schools, Farnham, Surrey, April 4.—For certain additions to be made at the above schools. William Hollest, Clerk to the Managers, Farnham.

Macclesfield, April 11.—Cheshire New County Asylum.—For the erection of gas works, steam engine, and other engineering works. Robert Griffiths, architect, Martin-street, Stafford.

London, April 5.—For the new school buildings, Crown-street, Soho. Messrs. Slater and Carpenter, 4, Carlton Chambers, 4, Regent-street.

Wolverhampton Main Drainage.—Contract No. 4.—April 4.—For the construction of upwards of 24,000 yards in length of brick, stoneware, and cast iron pipe sewers, and other works. H. Underhill, Town Clerk, Wolverhampton.

South-Eastern Rhilway Company, April 5.—For the construction of the railway from Charlton station on the North Kent Railway to East Greenwich. John Shaw, secretary, London Bridge station.

Hedingham Highway Board, April 7.—For the supply, delivery, and fixing of five cast-iron girders; two lengths, each 16ft., of cast-iron palisading; and two cast-iron guard-plates. Robert F. Stedman, Clerk to the Board, Sudbury, Suffolk.

Northamptonshire, April 11.—For the erection of farm buildings on the Fawsley Estate. Mr. Waters, Estate Office, Fawsley, near Daventry.

BATH STONE OF BEST QUALITY.

Randell, Saunders, and Company, Limited, Quarrymen and Stone Merchants, Bath. List of Prices at the Quarries and Depôts; also Cost for Transit to any part of the United Kingdom, furnished on application to

BATH STONE OFFICE,
Corsham, Wilts.

[Advt.]

BANKRUPTS.

TO SURRENDER IN THE COUNTRY.

Samuel Fern, Wincobank, Ecclesfield, joiner, April 8, at 2—David Terry, Whitwood, near Castleford, builder, April 13, at 12—Francis Kidd, Saltburn, Yorkshire, builder, April 5, at 11—James Perkins, East Dereham, Norfolk, builder, April 12, at 12.

ACT 1869.—PUBLIC EXAMINATIONS.

(At their respective district courts.)

James Gavin Cunningham, Sunderland, timber merchant, April 26, at 10—C. H. Whaites, North Elmham, Norfolk, brickmaker, April 18—J. Bond, Hartland, plumber and tinman, April 12—W. J. Partridge, Irthlingborough, Northamptonshire, builder, May 4.

SCOTCH SEQUESTRATIONS.

James Nairn, Perth, painter, March 31—Janet Thompson, Renfrew, brickmaker, April 4, at 12.

DIVIDEND MEETINGS.

T. B. Smith, King's-row, Victoria-road, and Upper Ebury-street, Pimlico, builder, April 23—G. Brownlow and R. E. Brownlow, Kingston-upon-Hull, timber merchants, April 7—T. Roberts, Llanfwrog, Denbighshire, builder, April 6.

PARTNERSHIPS DISSOLVED.

G. F. Forster, J. Brotherton, and A. Keir, Stockton, Durham, timber merchants—J. Greenwood, E. Tetley, and J. Pickup, Tong, Yorkshire, engineers—G. Strong and J. Hildrew, Sunderland, steam sawyers—T. Howlett and G. Bowes, Kingston-upon-Hull, house painters—G. Mallinson and W. Bakewell, Leeds and Dewsbury, Yorkshire, architects—Dyson and Sons, Mossley, Lancashire, builders—Dean and Ross, Shelf, builders—Leyland and Ashworth, Liverpool, builders—Wild and Co., Sowerby, masons—Cooper and Cullum, Camberwell-road, builders—Catton and Beaumont, Huddersfield, builders.

THE BUILDING NEWS.

LONDON, FRIDAY, APRIL 8, 1870.

EXHIBITION OF THE SOCIETY OF BRITISH ARTISTS, SUFFOLK-STREET.

ON the whole, we cannot speak in very favourable terms of this Exhibition. It is depressing from the large number of inferior works it contains, and the absence of any pictures of superior merit to outweigh the impression they make upon the mind. This depression is further enhanced when we remark that all the worst works are marked as sold, and that any picture which has some value or originality appears to have been overlooked. However, these are early days, and we must trust that future buyers will have better taste. The members of this society have, with very creditable good feeling, included a number of the late Mr. Hurlstone's works with their present exhibition. This tribute to a deceased painter is a graceful deed. Under these circumstances the points of a man's art at different periods of his life may be dispassionately reviewed, and the memorials of his strength be brought forward to counteract the weaknesses of his later life. His place, too, in the ranks of art can then be impartially assigned to him. In these ranks Mr. Hurlstone will never take a high place, but, though not a great painter, his art had a character of its own, and as such deserves to be represented by at least one of his pictures in a National Gallery of British art, though his originality has somewhat suffered from his too great anxiety to walk in the footsteps of the old masters. For many years he presided over this society. Since his death, however, the members have resolved upon a somewhat different course of action to the one which he pursued when he exercised that influence which an old and respected member of such a society must acquire. Mr. Hurlstone was a staunch enemy to the Royal Academy, and no member of their body would have had much inducement to exhibit in Suffolk-street during his lifetime. This terrible barrier (which we trust the Academicians have been aware of), has now been done away with, and three or four R.A.'s have sent a work of some kind to inaugurate a new régime. Mr. Leighton's is of the most importance. It is a head in oil, painted in a bold and masterly style. Mr. Maclise and Mr. Redgrave have each contributed a watercolour drawing, and Mr. Frith a rather vague chalk sketch. Let us hope that in future years the number of these contributions may increase, since it is most desirable that there should be a community of feeling between all bodies of artists.

To our minds the landscapes in this exhibition have the greatest merit, though we must except two pictures by Mr. Heaphy, taken from an incident in the life of Goldsmith, which that poet himself has further illustrated in his play of "She Stoops to Conquer." In the first picture Goldy, in all the glory of "the plum-coloured suit," is taking, with a grandiose air, a glass of beer from one of the young ladies of the family. The unconscious little poet is occupied only with himself and his finery, in curious opposition to which is the very tiny bundle, tied up in a handkerchief, containing all his wardrobe. He does not perceive the suppressed amusement of the supposed barmaid and her sister. In the second picture, Goldsmith, in tendering payment for his dinner and night's lodging, discovers his mistake. The amusement of the girls and the confusion of the poet are both well depicted. Should not these two pictures have been placed as pendants? No. 91, "Going to Market in Showery Weather," is Mr. G. Cole's best landscape. A gleam of sunshine peeps out through a drift of clouds, and against this bright gleam a dark group of cattle and figures tells with capital effect. The light and shade of the whole picture is extremely well managed. "Arundel Castle," by the same painter, is also an effective work. Mr. Wyllie's picture, No. 145, "The Ebbing Tide," is good in colour, and faithfully painted. No. 133, "Barley Harvest," by Mr. W. Gosling, is made up of little, but that little is very good and true to nature. No. 187, by W. Bromley, is well, though somewhat gaudily painted. The figures are a shade too costumy. The lady in the foreground seems to be more anxious to attract the gentleman than to partake of the stimulating herb. Perhaps the best landscape in the exhibition is No. 170, by H. Moore. The reflection in the water of the foreground is worthy of notice. This painter has succeeded in doing what so many artists try for in vain—he has produced an original effect, though it is rather a melancholy one. No. 388, "Lord Chief Justice Camden in the Stocks," by J. Hallyar, is an excellent subject, but badly treated. Surely the Chief Justice of England cannot have been such a very vulgar old man. The stocks, too, are unpicturesque; and, to judge by the landscape, far from the busy haunts of men, which is not usually the case, seeing that the offenders were put in them as a warning and laughing-stock for the village. "London during a Fog," by A. Ludovici, is a clever work, painted with great vigour. There is in this room a nice little landscape by C. Davidson, jun., No. 405, "Near Reigate, Autumn." No. 444, "Olivia and Viola," by E. S. Kennedy, is good in colour, and the faces are pleasing and well painted. Mr. Donaldson's head of "Gretchen" is rather too hot in colour. This painter succeeds better in watercolour. "The Pier Head, S. Ives," by C. N. Hemy, though somewhat too solidly painted, is very true to nature, and the sea is excellent. No. 592, by H. Vernon, is too teasingly painted. The touch of the foliage reminds one of worsted work. We have omitted to mention M. Clint's landscapes in their proper order. They are careful and truthful renderings of nature, and the artist strives laudably to retain passing effects. No. 159, "S. Catherine's, Scilly Islands," pleased us the most. We have not much space to spare for the watercolour department of this exhibition, though it is in many respects quite as good as the oil, and will repay careful attention. No. 682, by E. H. Fahey, is a capital bit of painting, the dull gray of the day is so truthfully given. We noticed two very excellent little studies by E. Temple, though their colouring was somewhat crude. "April Showers," by E. M. Wimperis, deserves praise; and No. 803, "Near Mortlake," by W. Hann, is a proof of how many picturesque subjects may be found in the neighbourhood of London. No. 665, by Mrs. Marrable, is a poor subject, but it is well painted. It is not, however, so good as this artist's work in the Dudley Gallery. On referring to our catalogue, we find that this exhibition is fast approaching to its fiftieth anniversary. We wish it well, whatever may be its failings, and observe with pleasure that though it does not take the first place in our estimation, it can still hold its own against many more youthful contemporaries.

THEORY OF THE ARTS.

IN pursuing any rational course of the study of design, the practical aspect of which I have, in the course of a few former papers in this journal, endeavoured to elucidate (as it regards the art of architecture), we should never lose sight of that broader view of the subject which comprehends our innate feeling for art, its relation to our necessities, intellect, and imagination, and its development from an early age. In one word, "Fine Art" is the *mental impress* or utterance of a nation conveyed in its manufactures, its buildings, its sculpture and painting, and its poetry. In an abstract and metaphysical sense it is the stamp of the mind and feeling upon any object or faculty of mankind. It should be the embodiment or expression of truth and beauty in whatever it touches—indeed, these qualities should be its essence, and inseparable from it. To dull, dead, expressionless matter, it may be said to bear the same analogy as the indwelling soul or spirit does to our corporeal being. On the contrary, it is not entirely a thing or creation of fancy or imagination, as most people imagine it to be—not an expression in which truth or beauty may have nothing to do. For if truth and beauty had nothing to do with the creation of art, but only the imagination,* there would be nothing to test it by, no standard by which we could estimate its merits. Grotesqueness and ugliness would under this idea be deemed only other names or qualities of that excellence or perfection which is commonly allowed for works of fine art, in the same way as some metaphysicians have contended that "good" and "evil" are merely words conveying different forms of human conduct equally meritorious.

It can be shown how this definition of art has accorded with the best periods of ancient art (and we now refer especially to architecture), and that its progress has been proportionate to this pervading idea, and has retrograded whenever mere fancy has supplanted the sterner qualities alluded to.

Every nation, however, has developed its fine art capacity as it has its religious thought and feeling, primarily according to natural tendencies, physical and mental characteristics, and secondarily, according to political influences; but this progress or development has invariably followed one general law common to the human mind of every race—namely, that the faculties of sense precede the intellectual,—the corporeal idea the spiritual idea.

Those countries that physically favoured the sensual were precisely those in which the arts first took root and flourished. The east first cradled and nurtured the fine art or perceptive faculty. Bodily wants were easily satisfied, and the organs of sense and imagination were aroused and gratified. In the infancy of the human race the imagination takes the place of the maturer faculty of reason. In the absence of any demand for an intellectual process, the imagination readily embodies ideas or converts them into tangible or bodily shapes. Hence we have "fetichism" or the deification of matter as the primæval form of religious thought, and the source of inspiration of all early poetic effort, and as Lord Macaulay observes, the imagination of man being free and unfettered, his earliest poetic faculty was the most prolific.

Philosophical writers, in the analysis of the power of imagination, have indeed generally considered it in reference to the sensible world, though its higher exercise is to be found in other and every field of thought. Addison and Dr. Reid have limited the province of the imagination to objects of sight, and this limitation appears to be correctly founded in all infantine displays of this power, whether of nations or individuals.

In Oriental and Asiatic compositions, the greater part of the metaphors are taken from celestial objects. "The works of the Persians," says Voltaire, "are like the titles of their kings, in which we are perpetually dazzled with the sun and the moon." The poetry of eastern nations abounds, too, in such figurative expression, and every juvenile attempt is characterised by the same reference to sensible objects borrowed from nature and art.

Again, the Polytheism of early nations gave an additional impulse to the imagination and the fine arts; for in spite of its chimerical nature, polytheism became the sole arbiter—in want of a more intellectual basis—of every

* I mean by "imagination" the association of ideas, the power of conceiving ideally, and without regard to reason. It is only when judgment or taste directs the combination of ideas that it can be applied to architecture.

thought or effort. Made up of fiction and inspiration, it yet established a sort of fundamental connection between ideas, which, as Comté observes, gave a grand character of unity of method and homogeneity to the primitive conception of mankind, a character which will only again recur when the philosophy of the future—the "positive" philosophy of Comté—is inaugurated, and then such an homogeneous and scientific method will be realised in a much more perfect manner. The numerous and varied festivals adapted to the nature of early worship supplied a happy channel for the exercise of the first efforts of the fine arts, which were then (unlike at present) in entire harmony with the spirit of religion. As Comté says: "The æsthetic faculties are in some sort intermediate between the purely moral and the purely intellectual; and their proper development happily react at once upon the *mind* and the *heart*, constituting one of the most powerful agents of education that we can conceive."

The fine arts, moreover, adapt themselves by preference to a fixed state of society admitting of a defined representation, and under polytheistic supremacy this condition was perfectly fulfilled. G. H. G.

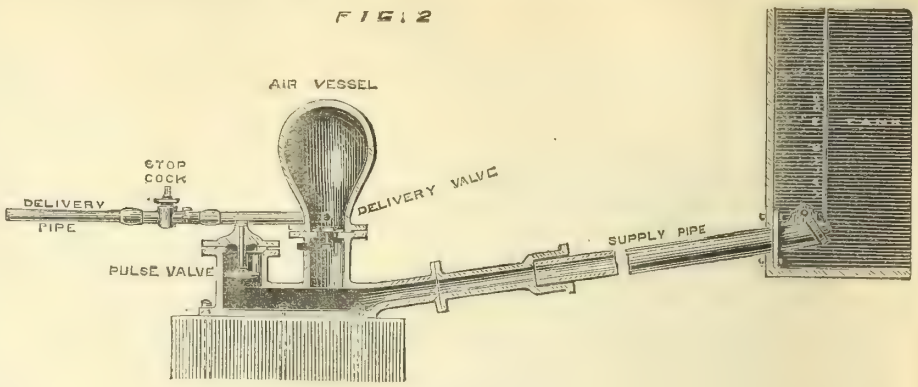
(To be continued.)

WATER RAMS.

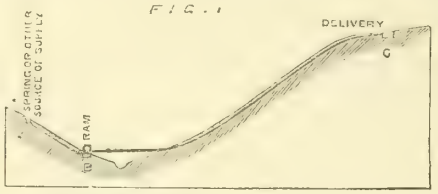
THE water ram, or hydraulic ram, as it is sometimes called by those who think common English not good enough for the occasion, is a useful instrument for utilising small quantities of water power, such as are too small to give effect to wheels or to turbines, or to water engines with reciprocating motion.

It is said to have been invented by Montgolfier, but its details have been much improved since his time. Its action results from suddenly checking the motion of a column of water, and providing, near the point at which the motion is so checked, a receptacle to receive and retain a small portion of the water of the column. It is a means of utilising the momentum of a column of water suddenly brought to rest, as distinguished from its mere quantity and fall. No great fall is required; moderate falls of 7ft., 8ft., up to 10ft. give higher duty than greater falls. The effective work done by water rams is usually 50 per cent. of the power expended, but by attention to the proper adjustment of the weights of the valves and the waterways, 66 per cent. may be obtained from them.

Fig 1 shows a general view of the arrangements, where A is the source of supply, B the position of the ram, and C the point of delivery. The position B must be so chosen that the surplus water may flow easily away from it. It must also be at a considerable distance from A—that is to say, it must be at such a distance as will give such a momentum to the column of water as will force the required quantity of water through the delivery valve rather than allow it to pass backwards into the source again. This would not be effected if the weight of the moving column were merely that due to the head of water; in that case the plenum of water would, under certain conditions of the valve, be delivered back to its source; but the momentum of a long column overcomes this tendency, and forces the plenum through the valve. At the same time, the distance of the ram from the source of the water must not be so great as that the friction of the water in the supply pipe would absorb any considerable portion of the power. Perhaps 100ft. is about a proper distance. The delivery pipe may be taken away to any distance or height, always remembering that distance counts, *pro tanto*, as height. That is to say, that, according to the size of the delivery pipe and its length in respect of the quantity of water to be delivered through it, a head of water is required which adds its own height to the absolute height of the point of delivery



above the level of the ram. In the other respect, however, viz., that of the question what is the *least* height of the point of delivery above the ram under which the ram will work, it has been found, both by calculation and experiment, that it must be at the least three times the height of the source of supply above the level of the ram. On the other hand, perhaps thirty times the same height may be about the limit.



There are many things to be attended to before the machine will be brought into perfect adjustment to the work it has to do. In a number of experiments that were made to determine the proper weights of valve and areas of waterway, the percentage of useful effect varied from 26 to 55 per cent., with variations in the weight of the pulse valve alone. With a fall of 14ft. in the supply pipe, and a delivery head 56ft. above the ram, the duty was 62 per cent. when the weight of the pulse valve was 1¼lb. and the stroke 1in., the waterway being 2½ square inches, or 2¾lb. when the stroke was 1⅛in. and the waterway 1½ square inches. With double the height of delivery the best weight was found to be 1½lb. when the stroke was 1⅛in. and the waterway 2½ square inches, or 3½lb. when the stroke was 1⅛in. and the waterway 1½ square inches.

In some other experiments, made to test the machine in respect of rapidity of motion, it was found that for comparatively large quantities of water expended per minute the duty was not more than 50 per cent., while with a smaller quantity of water and slower motion, the duty was as high as 63 per cent. The fall of water in these experiments was 9ft., and the height of the delivery above the ram 50ft. It would seem that as the circumstances under which the ram is to work vary, so should the proportions of the weights of the valves and the waterways vary, and perhaps the highest duty cannot be ensured without repeated trials in each case.

One thing to be observed is common to all water rams, viz., that the head of the ram must be so strongly bolted down to a solid foundation as to be absolutely immovable, for if only a slight motion be permitted in any bolt or other fastening, the constant jarring will soon knock the machine to pieces.

ON THE DORIC STYLE.

AN excellent monograph has been published by Dr. P. F. Krell (Stuttgart, Ebner and Seubert, 1870, illustrated by 24 Tables), on the Doric style. With reference to the word "Style," there exists a confused conception. J. S. Mill, in his "System of Logic," and before him Kant, as well as Hegel, have continually tried to admonish students, of whatever branch of science, to be careful in the use of words. "A name," as Hobbes has it, "is a word taken at pleasure to serve for a mark which may raise in our mind a thought like to some thought we had before, and which being pronounced to others, may be to them a sign of what thought the speaker had before his mind." The word style has been used, first, in a concrete sense to designate an instrument with which people used to write, or with which the designers sketched forms. After Homer and Pindar had produced their master-works of epic and lyric poetry, the word style received also an abstract meaning, and was thus turned into an attribute qualifying the peculiar way of expressing or formulating thoughts. The word style in this symbolical sense has been also applied to works of art, architecture, sculpture, and painting. Historians and art critics used it very freely as a means to trace the development of art in its different stages of progress, improvement, and decline. Dr. Krell, in perfect accordance with historical facts, treats the Doric style as the most important of Greek architecture, because it served as the very basis, I may say the root, of the gradual growth of the other architectural systems and styles of Greece. There can be no doubt that the Roman architect Vitruvius, under Emperor Augustus, was, though not the first—for he mentions older written sources from which he took his classifications—at least the one who traced the system of Doric architecture with a certain accuracy. But Vitruvius, adhering to the principles of Roman architecture of his times, has been guilty of many inaccuracies, and never gave us an historical account of the development of this style. In the *Renaissance*, when classical art was revived, Bramante and other great architects of that period did not favour very much the Roman-Corinthian style, but, keeping to the simpler Doric, they used the so-called Roman-Doric Style. Dogmatism took hold of the mind of architects, and with an arrogant disregard of the historical development of any particular style, they kept to their antiquated divisions, without troubling themselves in the least whether their distinctions and classifications were in accordance with facts. Winckelmann, the father of archæology, endeavoured to furnish us with the necessary materials for a systematic study of the history of classical art, without which an architect, whatever his practical attainments may be, can only be a clever mechanic and nothing more; or turn out an artist in the style of the stone-cutter who, when finishing the capital of a pillar was asked by a passing dilettante, "What order?" and received the answer, "What order? well, sir, the order of Mr. John Brown, the architect." Only by studying history the artist becomes conscious of his own craft, and is enabled to judge from a higher point of view not only the products of past ages, but also those of his own times. Hirt, the great art historian in Germany, followed in the steps of Winckelmann; Delagardette, in France, with his study of Pæstum, worked in the same direction; then Hittorf, Zanth, Penrose and Reynaud published their inestimable works, followed by Kugler, Schnaase, Gailhabaud, and Lübke.

At last Bötticher, of Berlin, throws a new light on the Classical period of art, in a philosophical spirit, and with an immense amount of learning. His able researches were continued by Semper, who combines historical observation with an unsurpassed originality of criticism in his great work "The Style" (Der Styl). Semper may sometimes err, but he is always suggestive, exciting, lucid, and logical; often dogmatic, but we may trust his axioms because they seem to rest on a basis of deep research. Though his classification and grouping have the appearance of novelty, it is always worth the trouble to verify what he asserts. Such men are the real benefactors of art students. They force them to think, to judge for themselves, and not to bow down before a Vitruvius or Pliny merely because these writers have been considered authorities for a long series of years. Further works conceived in a modern spirit of inquiry are Reber's "Geschichte der Baukunst im Alterthum," 1864, and a more recent publication by Beulé, "Histoire de l'Art Grec avant Periclés," 1868, and Dr. P. F. Krell's "Geschichte des Dorischen Styls" (History of the Doric Style). In accordance with modern teachers of the history of art, Dr. Krell asserts that the Doric style did not take its origin in Asia, as nothing strictly analogous can be found in the stupendous architectural works of the Indians, Persians, Assyrians, or Babylonians. He then investigates the theory started by some one-sided historians, whether it took its origin in Egypt and passed through Phœnician mediation into Greece, and very correctly states that this is a mere hypothesis, as the only building which bears a resemblance to the Doric style in some of its details, with regard to the columns, falsely called proto-Doric, is the tomb of Beni Hassan. But the echinus in those columns is altogether wanting, and the entablature is in a totally different style. He comes to the conclusion, after enumerating and minutely describing all the known Greek monuments in the Peloponnesus, as well as on the Greek Phœnician islands, that the Doric style of the Greeks, with its peculiarities, the triglyphs and metopes, had its origin in the North of Greece, as this style is mentioned before and after the migration of the Heraclides, and because its stern and simple character corresponds with that of the Doric people. He proves that Doric temples, like all other buildings, took their origin in wooden constructions, that only therein lies their analogy with other buildings: a circumstance which often misleads superficial students of the history of art to assume that every style of architecture took its origin in Egypt. The further development of architecture is influenced by climate, aspect of Nature, religious and civil institutions of the people. Ethnology gives us the very best basis for classification. The triangular-headed negroes (Prognathi) scarcely go beyond constructing triangular wigwams. The square-headed Turanians (Brachikephali) keep to square houses in the form of tents; and only the long, or oval-headed, Aryans (Dolicokephali) have been capable of conbining all geometrical forms for real grand architectural constructions, using the triangle, the square, and the arch at different periods in the progress of their social and artistic development.

With sharp, penetrating reasoning, Dr. Krell proves the essential differences between the Etruscan and Doric style; examines the lax-Archaic style (first so called by Professor Semper), which was very early developed in Sicily, a Doric colony. Then he passes on to the strict Archaic style, from which by degrees the powerful and pure Doric style developed itself about 600 B.C. The period in which this style flourished lasted till 520 B.C. The next period is distinguished by a change in the colossal forms of the pure Doric style, in which the Temple of Heracles, at Akragas, the Temple of Poseidon, of Juno Lacinia, of Athene on Ortygias, and the Temple of Apollo at Delphi, have been constructed. The Archaic style approaches its last development, and during this period of transition the Temple of Athene, at Ægina, has been built, a period which lasted till after the Persian wars, when Greek art reached the height of perfection, and the Attic-Doric or Attic style became predominant. It is therefore evident that an Attic style existed, had its peculiarities and distinguishing features, and the assertion that such a style "never existed" must be looked upon as the outburst of total ignorance of the history of art. In this well-known Attic style, which is a mixture of Doric simplicity and Ionic elegance, a blending of Northern with Southern architectural details were constructed (during the times of Kimon and Pericles) the Temple of Nemesis, the Temple of Themis, at Rhamnus in Attica, the Theseus Temple in Athens, a Temple of Heracles, the Parthenon of Athens, a Temple of Apollo at Bassæ, in Arcadia, and the Telesterrium at Eleusis, the Propylæa of the Acropolis of Athens, the Temple of Phigalia, &c. After this period the Doric style came altogether out of fashion. Under Alcibiades, the architecture of the Greeks, as well as their national character, degenerated: a proof that the moral and intellectual condition of a people are closely connected with their Art. To students and lovers of ancient architecture, desirous of acquiring correct information, we warmly recommend Dr. P. F. Krell's "History of the Doric Style." G. G. Zerffi.

GOSSIP FROM GLASGOW.

(From our Correspondent.)

A REPROACH brought against Glasgow, and with great justice, is its high death-rate. This excessive mortality has been ascribed to various causes: to the pollution of the river by sewage; to the pollution of the air by gases; to the situation of the city, a great basin receiving water from every side as well as from above; to the character and habits of a great portion of the people—their ignorance and indifference, intemperance and improvidence; and to overcrowding in the poorer districts in the centre of the city, from the supply of house room being unequal to the demand. Means of various kinds, where meanwhile practicable, are, however, being applied in the endeavour to check and reduce it. Rome was not built in a day; nor can the improvement Act, even had it a Baron Haussmann at its head, remodel the wynds and vennels of Glasgow in a twelvemonth. More immediate machinery must be brought into operation, and of this, a sanitary inspector, with a large staff of assistants, has been appointed; also a number of women, whose office it is to instruct the lower orders in such simple duties to themselves and society as cleanliness and common decency. There is likewise a movement being made for having better and (if possible) cheaper dwellings built for the labouring classes. The present Scottish mode of constructing dwellings in flats, or one house upon the top of the other, necessarily puts a large population upon not only a small area, but also a small feu-duty; it is for those with "speculation in their eyes" to say whether spreading houses of fewer floors over a larger superficies would be profitable to the proprietor as well as healthful to the occupant.

A paper upon, *inter alia*, "over-crowding," was lately read in the architectural section of the Philosophical Society, by Mr. Salmon. Mr. Salmon is not only an architect of long and high standing, but is also a magistrate, and, if I mistake not, a member of the Improvement Trust, and consequently he has had exceptional opportunities for seeing his subject from several points of view. The following is one of the arguments of his paper:

While those living in the villa districts had each seven thousand five hundred cubic feet of air, the industrial classes in the city had only five hundred cubic feet, and the substratum of the population no more than three hundred. Before suitable dwellings could be built for the humble classes, architects must give over many old customs. In the first place, they must abandon the plan of erecting tenements of four stories. A common form of those houses was to have accommodation for sixty, eighty, or a hundred inhabitants. The area on which these stood would average four hundred and twenty square yards for sixty people, five hundred and sixty for eighty people, and seven hundred for a hundred people; or at the rate of six hundred and ninety-one inhabitants to the acre; or about five hundred cubic feet within walls to each inhabitant. That was far too small an amount of air-space in a city. His opinion, founded on forty years' observation and experience, was that the only solution of the problem of housing the working population was the extension of the area of the city, and the building of villages as close to the boundaries as ground could be obtained. In these villages, every variety of houses for the working classes should be provided, from the cottage for the foreman or small master, to the living-room and bed-closet for those for whom they might be convenient. A large proportion of the houses should be restricted to one story; none should be more than three, and of these as few as possible.

I have read with much pleasure Mr. Seddon's articles on the "painted" glass in our cathedral. I have since seen a letter by Sir George Harvey, President of the Royal Scottish Academy, in which he criticises two stained glass windows, just completed by Ballantine, of Edinburgh. After alluding to the appropriateness of design, he says:—Another feature in this glass is here conspicuously shown in the colourless light transmitted, even when the sun shines through it at noon. This effect is the result of the irregular structure of the glass, each undulation forming a prism by which the rays of light are refracted at innumerable angles, and as they cross in all directions neutralise each other before they reach the wall or floor of the interior of the building. This effect, so pleasing to the eye, contrasts favourably with the thin flat enamelled glass used in the Glasgow cathedral windows, where the transmitted light, carrying the colour with it in unmingled rays, stains the building with many coloured gaudy hues wherever it chances to fall. Mr. Seddon, in one of his articles, bestows a word of praise upon our Gothic. It is, however, of its Classic that Glasgow has chief reason to be proud—of the works of Stark, Hamilton, Wilson and Thomson. And from whatever influence, so firmly does Classic seem to have taken hold of us, that in the last past thirty years or so, during which time church building has, from various causes, been alike active and extensive, perhaps more than half the number of our churches have been designed in not "the only appropriate" Gothic, but in Greek, Roman, or Italian. And to this may be added the significant indication that many of these Classic churches were the results of competition.

Of the greater number of play-houses, "the last scene of all" seems to be a grand conflagration. It is little more than a twelvemonth ago that the Prince of Wales theatre went over to the majority, and on the 25th of March the Royal Alexandra followed it. It was a building about three hundred feet long and a hundred and fifty wide, was respectable as a place of entertainment, had no architectural pretensions of any kind, has had its value estimated at six thousand pounds, or thereby, and that's all that may be said about it. Since the burning in 1829 of the great theatre in Queen-street, no fewer than five theatres in Glasgow have been destroyed by fire. Two, however, both upon the same site, have escaped this fatality. First, the old theatre in Dunlop-street, which was taken down by Mr. Alexander, and replaced by a house highly ornate in its decorations, and remarkable for comfort and for facility of seeing and hearing; and secondly, this model house, some years after Mr. Alexander's death, having been overtaken by the wonted fate, its more commonplace successor, which—"to what base uses we may return, Horatio!"—is just now being "stamped out" under the iron heel of the Union Railway. One of the five burned theatres belonged to Professor Anderson, "the Wizard of the North." Having last week his "rough magic here abjured," Mr. Anderson intimated to his farewell "audience" that it would be as proprietor and manager of a new and magnificent theatre that he would next appear in Glasgow.

There is a proposal to erect a statue in George-square of the late Thomas Graham, the Master of the Mint. A statue, in which Glasgow ought to be largely interested, is about to be erected in Edinburgh—that of Dr. Chalmers, the eminent divine, pulpit orator, and political economist. I ought to have mentioned in my last that the sum intended to be expended on the commemorative fountain is "from £2000 to £4000"—a wide enough margin for competitors.

The Surveyor.

PRINCIPLES OF LEVELLING.

THE true figure of the earth is not precisely that of a sphere, but of an oblate spheroid, compressed at the poles, and protuberant at the equator, in consequence of the centrifugal forces engendered by the rotation of the primitive fluid or semi-fluid mass upon its axis; and the dimensions of the spheroid, at the mean level of the sea, as deduced from skilful combinations of the meridian arcs measured in various latitudes, are exhibited in the following table :—

Diameters of the Earth.	By Bessel.	By Airy.
	Miles.	Miles.
Equatorial	7925·604	7925·648
Polar	7899·114	7899·170
Mean	7912·359	7912·407
Difference of diameters ..	26·490	26·478

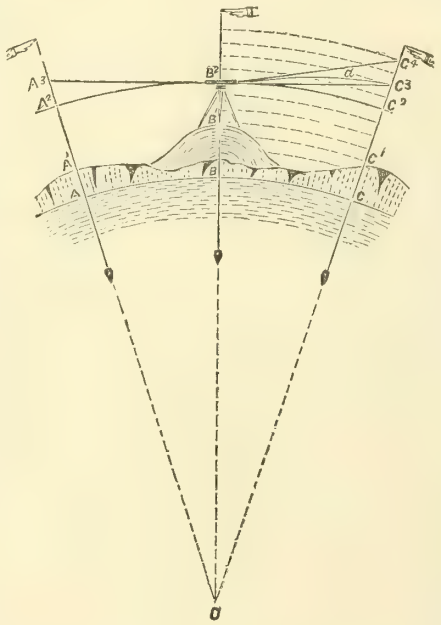
According to these dimensions, the surface of the earth at the equator is nearly 13¼ miles further from its centre than the surface at the poles; and the equatorial diameter is to the polar axis in the ratio of 300 to 299 nearly. This ratio, however, is so small, that a spheroid made in accordance with it cannot be distinguished from a sphere, except by the most delicate admeasurement, since in a 15-inch globe the polar axis exceeds the true length by only 1-20th of an inch. In the art of leveling, therefore, the earth may be regarded as a sphere having a mean diameter of 7912½ miles, which is nearly equal to its mean diameter, without sensible error.

Now, it is a property of the sphere that its surface is everywhere equally distant from a point within called the centre; consequently points or lines taken thereon in all directions are truly level with each other. If the earth were at rest, and were entirely covered by matter either wholly or partially fluid, the reciprocal attraction of the particles would cause the surface to assume a spherical form. Owing, however, to centrifugal force combined with the force of gravity, the former arising from the diurnal rotation of the earth, and the latter from its attraction, the surface of the sea, and of every separate fluid, is not precisely spherical, but spheroidal. But the deviation from exact sphericity of any fluid surface of moderate area is so slight that it may be considered as spherical, and points or lines taken thereon in any direction as truly level one with the other.

The sphericity of any large body of water, such as the sea, or a lake, when calmness prevails, is obvious; but any small body, such as a reservoir, or a pond, when quiescent, appears like a perfect plane. Thus the depression of the sea, below a tangent to it at the distance of 10 miles from the point of contact, is as much as 66⅔ feet, while the depression at the distance of a quarter of a mile is only half an inch. For all practical purposes, therefore, any small fluid surface in a state of repose may be regarded and used as a plane. And so truly smooth and mirror-like does a fluid surface become, when quiescent, that the rays of light which are incident upon it from near or overhanging objects form exact optical images thereon of the objects; and the eye that receives the rays reflected therefrom fancies the objects to be situated in the direction of the mirror.*

The surface of the land follows the curvature of the earth, and deviates therefrom only so far as it rises above or falls below the general level of the sea. But the inequalities of the land, however large they may appear on close view, are as nothing when compared with the earth as a whole; for the highest chains of mountains may be represented on a globe 15in. in diameter by the smallest grains of sand, and the general elevations of the continents and islands by strips of rough paper pasted thereon. The land, however, is nowhere regular, even, and smooth, like still water, but is everywhere irregular, and is distributed into hills, valleys, plains, and mountains, all of which differ in form and extent, and are more or less elevated and depressed, undulating and uneven. Points, objects, and places thereon are therefore at different levels, or, what comes to the same thing, are at different distances from the centre of the earth.

The object of levelling is to find how much higher or lower any one point is than another, or the difference of level between any two points. In a more extended sense levelling consists in determining and representing the relative heights of any number of points or places in a line traced in any direction upon the earth's surface from its centre, or from an assumed level surface† or line equidistant at every point from that centre. This may be illustrated by the following diagram and description.



Suppose A B C to be a circular arc coincident with part of the earth's spherical surface, and O the earth's centre; then any points A B C in that arc are obviously at the same distance from the centre O, and truly level with each other. Now let the undulating line A_1 B_1 C_1 be part of the earth's irregular surface; then any points A_1 B_1 C_1 in that line are evidently at different levels, that is, at different distances from O, and also from the arc A B C. From this it follows that any arc, as A B C, coincident with or parallel to the earth's curvature, is the datum from which the true difference of level between any two points, as B_1 A_1, may be determined, and to which the separate levels of any number of points, as A_1 B_1 C_1, may be referred. Thus the true difference of level between the two points B_1 A_1 is simply the difference between the vertical heights B B_1 and A A_1, or B B_1 — A A_1, assuming B_1 to be higher than A_1; and the separate levels of the several points A_1 B_1 C_1 are shown by the vertical heights A A_1, B B_1, C C_1, with reference to the arc A B C as a datum or standard of comparison.

It may here be observed that in plotting sections the datum A B C is never represented by an arc exactly concentric with the earth's curvature, but by a straight horizontal line which, owing to the immense length of the earth's radius, is so nearly identical therewith, that it is considered sufficiently accurate for the purpose. It may also be observed that, in reducing levelled points to, and in plotting reduced level points from a datum line, it tends greatly to convenience as well as to accuracy when the datum line is chosen, say 50ft., 100ft., or any other number of feet below some station-point, so as to be well below the lowest point in the surface. The reduction of all the points will then be subtractive, and mixed subtractions and additions will be avoided.

When at rest and uninfluenced by surrounding objects, the plumb-line and a fluid-surface assume positions, the former perpendicular to the horizontal, and the latter perpendicular to the vertical, with a suddenness and a certainty unapproachable by anything else. Hence it is by means of an instrument called a level*, having either a plummet suspended to a line, or a fluid with an air bubble floating thereon contained in a cylindrical glass tube, attached to it for the purpose of determining vertical and horizontal lines, that the operation of levelling is performed. The nature and application of these lines in levelling may be explained as follows.

When heavy bodies are raised above the surface of the earth and quietly abandoned, or are suspended from any points, the attraction of the earth† compels them to fall to the ground, or to hang from the points of suspension in vertical lines, which are exactly perpendicular to the earth's spherical surface, or to that of still water, and converge to its centre. Thus the plumb-lines A_3 A, B_2 B, C_4 C, show the directions of the vertical or of gravity at the respective points A_1 B_1 C_1, are perpendicular to the line or surface A B C at the respective points A B C, and meet in the centre O. From this it will be seen that no two vertical lines can be absolutely parallel. But for the same reason that a small surface of still water may be regarded as a plane, any two or more plumb-lines at short distances apart may be con-

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* This may be exemplified by the old fable of the dog and the shadow:—A dog crossing a rivulet with some meat in his mouth saw the image of himself represented on the surface of the water. Believing it to be another dog with another piece of meat, he greedily snatched at the shadow and dropped the substance, which immediately sank to the bottom of the stream. Milton also describes the mirror formed by a crystal fountain as our first mother Eve's looking-glass—

"A murmuring stream
Of waters issued from a cave, and spread
Into a liquid plain, then stood unmoved,
Pure as the expanse of heaven; I thither went
With unexperienced thought, and laid me down
On the green bank, to look into the clear
Smooth lake, that to me seemed another sky.
As I bent down to look, just opposite
A shape within the watery gleam appeared,
Bending to look on me."

And with what wonder and delight does a child contemplate in a still glassy pool, or a soft gliding stream, the picture of the adjacent scenery painted thereon by nature the beautiful blue sky above, with its snow-white clouds, golden fringed and flushed with crimson, and the lovely landscape on either hand, with its verdant trees, glistening shrubs, and flowering plants—

"the pied wind-flowers and the tulip tall,
And narcissi, the fairest among them all,
Who gaze on their eyes in the stream's recess,
Till they die of their own dear loveliness."

all appearing inverted in the clear mirror formed by the limpid water.

† The surface of the sea, which is connected and on the same spheroidal level all round the world, is the datum whence its depths are sounded by hydrographers, and whence the heights of hills, mountains, lakes and towns are measured by geographers, who for this purpose suppose it to be continued beneath the continents and islands.

* The plumb-level and the plumb-rule, with an attached plumb-line giving the horizontal in the former and the vertical in the latter, were probably the first philosophical instruments ever employed in scientific and building pursuits. The plumb-level has been almost superseded by the spirit-level, but the plumb-rule is still universally used by artificers.

† Every particle of matter of which the earth is composed attracts or gravitates to every other particle, and thus all the particles are held or bound together, and form a spherical body, in whose centre the aggregate of the attractions is concentrated; hence the attraction of the earth diverges in every direction from its centre through its mass, and through every point in its surface into space, like rays of light from a luminous object. The force exerted by this attraction on all bodies increases as the distance diminishes, diminishes as the distance increases, and is equal at equal distances from the earth's centre; and the forces with which bodies gravitate to each other, are directly as their masses, and inversely as the squares of their distances. Thus, if the mass of one body be three times greater than that of another, its gravitating force is three times greater; and with a distance three times greater the gravitating force is nine times less.

sidered as parallel to each other, the deviation from the true level in the one case and from exact parallelism in the other being inappreciable. When, however, two plumb-lines are at considerable distances apart, the divergence is sensible. Thus, if two plumb-lines, A_3 A, C_4 C, be one mile apart at A C, the measure of the interval A_2 C_2, at an altitude of one thousand feet above A C will be rather more than one mile and three inches.*

A horizontal line is a straight line at right angles to a vertical line, and also a tangent to the earth's spherical surface, or to an arc concentric therewith, at any given point. For this reason it is called the line of apparent level. It is that which a levelling instrument traces at each backward and forward observation, and from which the difference of level between any two or more points or objects situated above, between, or below it is ascertained.

Thus, let B_1 B_2 be a levelling instrument, the line of collimation of which is adjusted truly horizontal by the spirit-level. Then the back sight B_2 A_3, and the foresight B_2 C_3, are identical with the horizontal line A_3 B_2 C_3 forming equal angles A_3 B_2 O, C_3 B_2 O, with the vertical B_2 O passing through the axis B^2 of the instrument; and the true difference of level between any two points A_1 C_1, situated in the respective verticals A_3 O, C_4 O, equally distant from the vertical B_2 O, is simply the difference between the staff readings A_1 A_3, and C_1 C_3; for, as the distances B_2 A_3, B_2 C_3, are equal, the radii O A_3, O C_3, passing through A_1 and C_1, are equal, and the angles B_2 A_3 O, B_2 C_3 O, are also equal.

If the staff-readings A_1 A_3, C_1 C_3 be respectively 8·64 feet and 6·28 feet, then the height of the point C_1 above the point A_1 will be 8·64 — 6·28 = 2·36 feet. This example shows how simple the process is of finding how much higher or lower one point is than another—the line of collimation of the telescope, when set truly horizontal by the spirit-level, gives the line of apparent level† over the two points; and the difference between the two heights measured vertically from this line to the two points, by a levelling staff, gives their difference of level. It is important, however, to observe that the accuracy of the difference of level determined thus between any two given points depends upon the position of the levelling instrument, or of the point whence the apparent level line is traced by it, with reference to them.

Thus, when the instrument is placed midway between any two points, their true difference of level is determined by the difference between the readings of the staves held on them. When the instrument is set up over one of them, and the staff is held on the other, the height where the line of collimation of the telescope intersects the staff is above the true height by an amount equal to the dip of the earth's curvature at the staff; consequently this amount must be subtracted from the difference between the readings at the staff and the instrument to obtain their true difference of level. Again, when the instrument is placed at unequal distances between them, the difference between the staff-readings must be diminished by the excess of the earth's curvature at the farthest staff over that at the nearest staff. It is necessary to explain this effect of the earth's curvature more in detail with the view to avoiding it, or to deducing rules for correcting it.

(To be continued.)

* When a heavy body falls from a great height, its path is not in a true vertical line, but in a slightly curved line, which cuts the ground in advance of the vertical line drawn from the point whence the body was disengaged. This is owing to the body, at the moment of its descent, moving in a greater diurnal circle from west to east, by the earth's rotation, than the earth's surface, and therefore the body strikes the ground eastward of the vertical line, by a minute quantity equal to the difference between the upper and lower velocities in the time of the fall. The attraction of a hill or a mountain also produces a sensible deviation of the plumb-line from the vertical. Thus, if two plumb-lines be suspended on either side of a mountain, the attraction exerted by the mountain upon the plummets will draw them so much towards it from the vertical that instead of the plumb-lines converging at the centre of the earth, they will meet at a point nearer to the surface.

† Such a line is commonly understood as a true level line; but it is not so. An arc of a circle, whose centre is the centre of the earth, is a true level line. A straight line at right angles to a vertical line falls towards the vertical 8in., 32in., and 72in., at the respective distances of 1 mile, 2 miles, and 3 miles therefrom.

INSTITUTION OF SURVEYORS.—THE EDUCATION OF THE SURVEYOR.

THE discussion on Mr. Jeremiah Matthews' paper on the education of surveyors (which appeared in The Building News a fortnight ago), commenced on Monday evening last. In the absence of the President,

Mr. E. J. Smith was voted to the chair.

Mr. Sturge said that Mr. Matthews had referred to the paper which he (the speaker) read about twelve months ago on the subject.* He was glad that Mr. Matthews agreed with the general tone of his paper, although differing from it in some respects. However, he thought they both agreed, in common with the members of the Institution, that in order to enable the surveyor to rise to that eminent position in the profession which might enable him at some future time to fill the chair of the Institution (now so ably occupied by Mr. Clutton), he should have a good sound general education. He agreed very fully with Mr. Matthews as to the professional or technical education of the surveyor, and looking to the increasingly important position which the profession was taking, such education was more than ever necessary. The only point on which he differed from Mr. Matthews was on the question of a university education. Although agreeing very much with Mr. Matthews' observations as to the effect of a university education in enlarging the mind and strengthening the reasoning powers, he (Mr. Sturge) entertained the same doubts as to the advantages of such an education, which he expressed in his paper before referred to. Though he would not say that it was inexpedient in all cases for a young surveyor to go through a university training, he thought that, on the whole, the balance was against such a training. In the course of the discussion which followed his (Mr. Sturge's) paper, an opinion was expressed that the system of education therein laid down was too exacting, but he was unaware that he had laid down any item of professional education which was unnecessary or undesirable for the surveyor to acquire. It was true that there were men in the profession who had attained to considerable eminence even although they had entered it rather late in life, but such men would probably have attained still greater eminence had they in their youth had such an education as was now considered necessary for a surveyor. After all said and done, when the theoretical education of the surveyor had been gone through, it was of but little value unless supplemented by the practical education which was obtained by going through the routine of an office, the management of estates, and all the other branches of the profession. It was obvious that such a course of theoretical and practical professional instruction would occupy a good many years, and he was willing to admit that perhaps the standard laid down by him in his paper might seem to be somewhat too exacting, but it should be remembered that it was necessary to aim high. But if his (Mr. Sturge's) course of education was too exacting, Mr. Matthews' plan was still more so, on account of the university education involved. Supposing a young man went to college at eighteen years of age, and made the most of his time, he would be twenty-one before he came out with his degree, and at that age he would not have received any special technical education necessary to fit him for his profession. Although the trained mind of a well-educated university man was more likely to conquer the difficulties of his professional education with greater ease than one who had only received an ordinary school education, he was inclined to think that five or six years was necessary for him to acquire the requisite theoretical and practical knowledge of the profession, and a man would be six or seven and twenty before he could set up in business for himself. Although that was not an absolute bar to a university education, it was a very great objection to it. Practically, he thought it might be said to come to this: In the case of those to whom expense and time were no objects, a university education might be the more desirable for their sons, but for the general bulk of students, it would be quite enough to have to acquire the special professional education after leaving school.

Mr. T. Chatfeild Clarke said that what struck him with respect to the cultivation of many of the professional men with whom he met was that they were too specially educated; that for their earliest life they devoted themselves very actively to their profession, and allowing it to engross their whole time, didn't leave themselves that time for the cultivation of a general interest in politics, literature, and the general interests of society which they ought to do. This he thought was a great want in the profession, and it was a great reason why so many of its members were such bad men of business as they were. He was in favour of a university education where possible, as the associations of college life tended to widen a man's sympathies in a way that was impossible to those brought up exclusively from pupilage to clerkship, and from clerkship to practice. The subject was a very large one, and if taken on the ground of the education of young architects, it presented a very much wider field for discussion. He felt that the education of young architects at the present moment was very deficient. However conscientious and desirous an architect might be of giving to his pupil all the knowledge he could, the field of education through his office was not wide and general enough; it did not take in everything, both artistic and practical, in a sufficiently systematic way. He found the disadvantage himself some years ago, and he saw it now with regard to his own pupils. Classes and courses of lectures were required to supplement the knowledge obtained in the office. After commending the Architectural Art Classes now being formed, Mr. Clarke said that the Institution of Surveyors ought to consider, in connection with the question of professional education, whether they could combine with the objects of the Institution the establishment of classes for the education of young surveyors, on the plan of those alluded to for architects.

Mr. C. M. Bidwell, as a university man, remarked that it should not be taken as a matter of course that a university education could not be of direct value in the professional education of a surveyor. There was such a thing as a natural science tripos at Cambridge, in which a man could take degrees in chemistry, botany, geology, and the other natural sciences of direct value to the surveyor as a professional man.

Mr. E. Ryde repeated what he had said on a former occasion, namely—that, after all, experience was the great thing which the surveyor needed in order to succeed in his profession. He contended that a university education was not necessary to enable a man to become a surveyor, and said that a good education in one of our public schools was all that need precede the usual system of pupilage and clerkship.

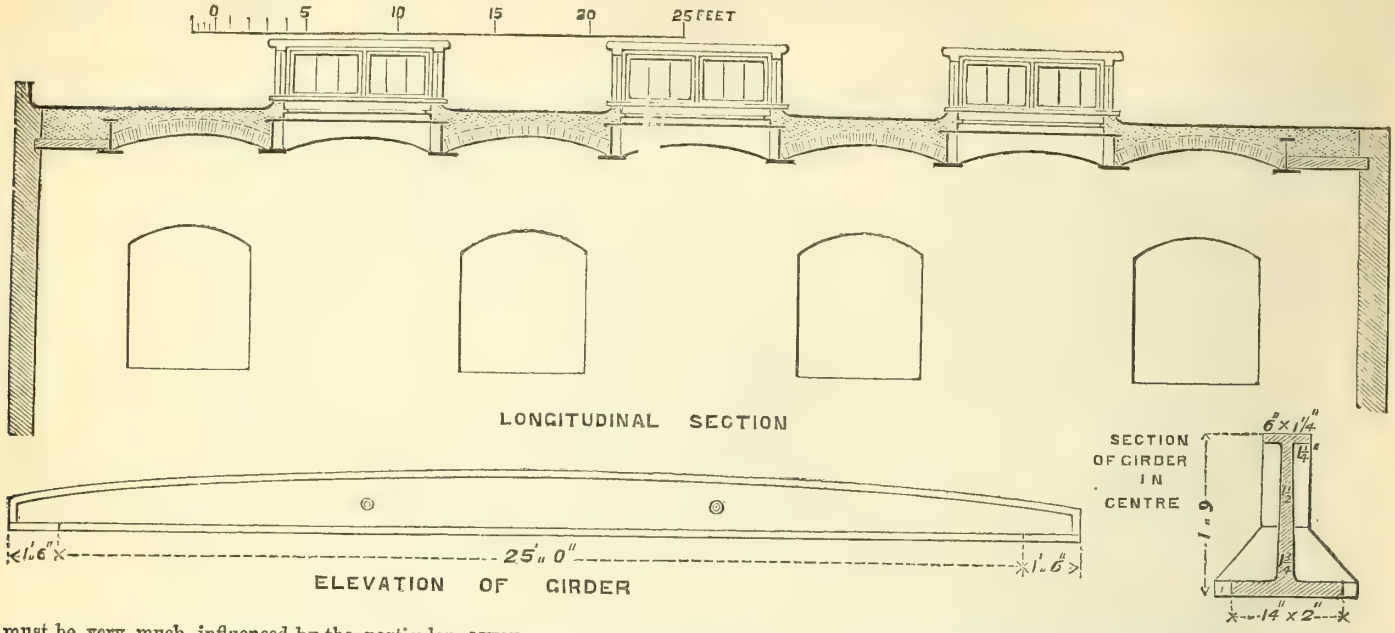
Mr. Menzies was in favour of a university education. All classes at the present time were considering the subject of education, and it behoved surveyors, as a body, not to be behind hand in such a matter. Surveyors were now brought into contact with the highest minds in the land, and he contended that a man of culture would rather have to do with a surveyor whose mind was somewhat on a level with his own. Even supposing that a young man entered on a university curriculum, he would still have four or five months in each year in which to give his attention to his strictly professional education.

Mr. C. Bidwell having made a few remarks in support of Mr. Matthews' paper,

The Chairman summed up the discussion. After expressing regret at the absence of Mr. Matthews (which was occasioned by illness), he proceeded to enumerate the different functions of the surveyor, and compared the views embodied in the papers of Messrs. Sturge and Matthews, arriving at the conclusion that a university education would enable a person who had it to enter into active business as soon as, if not earlier than, if he took any other course. The difference, he thought, between the two systems was not one of time; the university course took considerably more capital than if a youth went through his articles and then took a situation of £100 a year. Wherever the means were available, he agreed with Mr. Matthews' plan; at the same time, he thought that the determination of either course

* See Building News, Vol. XVI., p. 17.

THE NEW NG'S COLLEGE ROOF.



must be very much influenced by the particular circumstances of each individual.

The usual vote of thanks to Mr. Matthews having been passed, it was announced that the next meeting of the Institution would be held on Monday, the 25th inst.

THE NEW KING'S COLLEGE ROOF.

THE above engraving illustrates the new King's College roof, lately erected in place of the one which came to grief a short time back. But few particulars are needed, as the illustrations almost explain themselves. Each of the girders covers a space of 25ft. × 9ft. The breaking weight is supposed to be in excess of 50 tons in the centre, or from 9 to 10cwt. per superficial foot all over. The girders are proved to 28 tons in the middle, or 5cwt. per superficial foot for a distributed load. The present load is 200lb. per foot, without making any allowance for vacant places where skylights are formed. As a crowd of people closely packed will not add more than 90 to 100lb. per foot, it will be seen that ample precautions have been taken. The roof is composed of 9in. brick arches, the spandrels filled with concrete, and the whole covered with Pyrimont Seyssell asphalte, now so generally used, and with such good results (care being taken to use the *Pyrimont* and not inferior asphaltes) in roof construction. The work was carried out by Messrs. Dines and Banderet. The old roof had stood for forty years, had often been covered with sightseers, and in all probability, would have remained intact but for the Embankment and Railway works. Settlements are now to be seen along the entire terrace in front of Somerset House, leaning towards the river. It could well be wished that the late accident may have imparted some degree of caution to those charged with the conduct of these works, or fears may be very reasonably entertained for the safety of other structures—not excepting S. Paul's Cathedral itself.

THE BUILDING NEWS SKETCH-BOOK. No. XXIII.

S. Mary's Chapel, Barnwell, Cambridge.

THIS old Norman building stands in a meadow near where the famous Stourbridge fair was held. It appears from the style of its architecture to be of the time of Henry I., and consists of a nave and chancel, separated by a rich chancel arch, some good doorways, and small windows with mouldings of very good execution. The stringcourses are bold, and seem to have had much care bestowed upon them; and the corners of the building are ornamented by shafts with well-carved capitals. The wooden roof is also well worthy of attention.

This chapel was for many years used as a stable, and had to be propped up, but it has lately been restored, through the exertions of a few gentlemen who could appreciate its value. J. R.

NEW WESLEYAN CHAPEL, ALSAGER, CHESHIRE.

THIS chapel (with which it will be seen a school is combined) occupies a commanding position in the main road through the village. The design which has been prepared by Mr. George B. Ford, architect, Burslem, Staffordshire, is in the Gothic style, the chief peculiarity being that whilst strictly characteristic of that style, all obstructions to sight or sound are obviated, which in mediæval architecture are so prevalent. The arrangement of plan is that of a parallelogram for the chapel.

The materials used have been pressed red bricks, relieved by brick bands of other colours, and Hollington stone dressings. The inside dimensions of the chapel, including portico, vestibule, and vestry, but exclusive of school-room, is 83ft. 6in., and the width, exclusive of buttresses, is 38ft. 8in., and will accommodate 400 persons. The main front of the chapel is divided into three bays, the centre bay being carried up as a gable, and the side bays being the gallery staircases, the roofs of which are hipped. The main feature in the front of the building is the entrance to the portico, which is composed of stone arches finished with moulded labels with carved bosses, resting on three stone piers, having foliated caps and moulded bases.

The centre arch of the porch entrance is carried up in a pedimental form, and the spandrel is filled in with carved foliage. In the upper part of the gable is a four-light traceried window with label mould round the arch. The gable is finished with moulded stone coping, springing from panelled and canopied knees, and terminating with saddle stone and iron vane. The staircases, which are carried up in the side bays, form a square on the plan and materially add to the good effect of the front of the chapel; they are finished with hipped roofs, springing from moulded brick cornices, resting on panelled stone frieze, under which is a moulded brick string. Each roof has an iron vane. The staircases are lighted by lancet windows, with small wheel windows over the same.

The sides of the chapel are each divided into five bays by buttresses projecting boldly from the wall line and ascending in two set-offs, having slopes of black brick, which will be of greater dura bility than stone; each bay contains a two-light window, with traceried head. At the east end of the chapel, viz., behind the rostrum, is the orchestra, semi-octangular in shape, and underneath this is the minister's vestry, and at the rear of the vestry is the school-room for the accommodation of 100 children, the roof of which, being lowest, is hipped and finished with an iron vane. Above this roof rises that of the orchestra, which is finished in the form of a gable. The roof, which is 36ft. in span, is formed without any horizontal tie, and whilst having a pleasing effect, is so constructed as to prevent, as far as possible, any reverberation of sound, and to afford, by means of a very simple and inexpensive contrivance of revolving shutters, a means of thoroughly ventilating the building without draughts.

The body of the chapel is approached from an open portico, 7ft. wide, which leads into a vestibule 6ft. wide, and in this vestibule are folding doors, with swing hinges, so arranged as at all times to prevent cold currents from communication with the interior of the building. From the portico ascend staircases to the gallery.

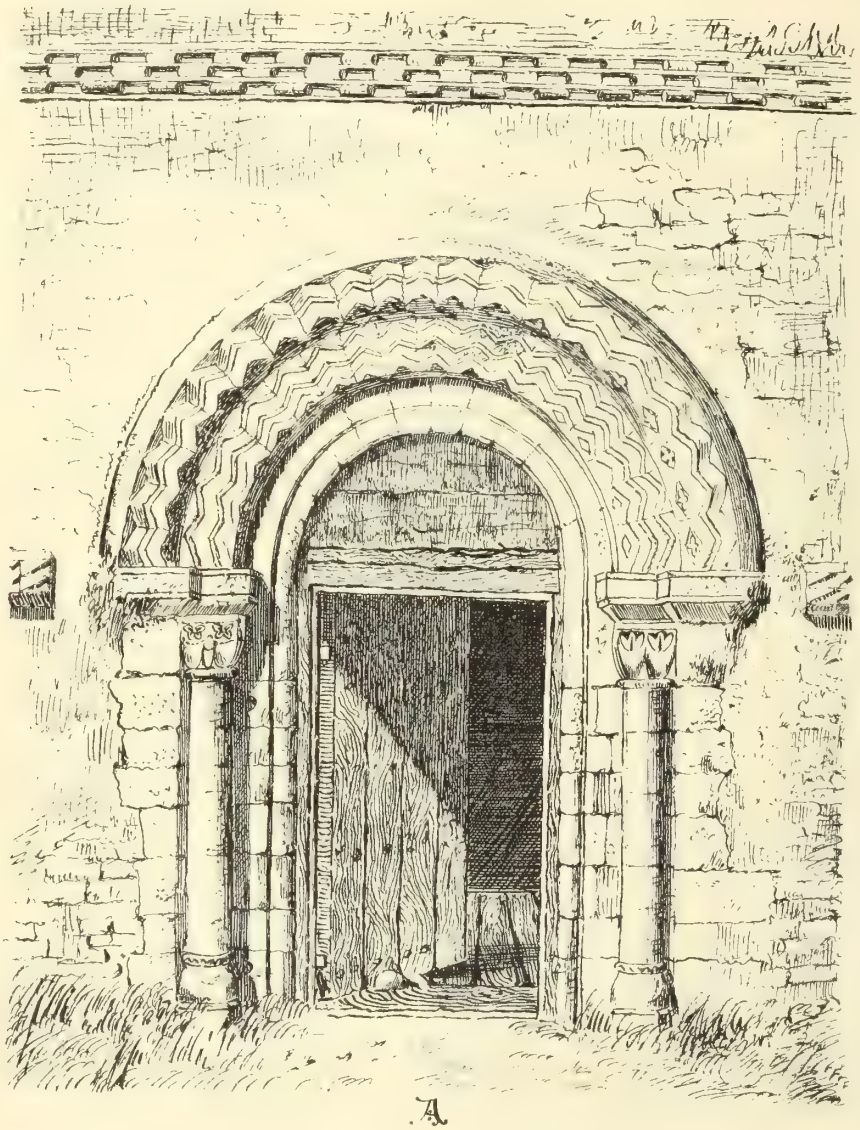
The woodwork of the interior of the chapel is of pitch pine and red deal, stained and varnished, the pews and free seats being alike made with sloping backs. The rostrum, which is of a neat design, is of pitch pine.

The floor of the chapel, both to the pews and the aisles, slopes down from the vestibule to the communion, thus affording to persons sitting the most distant from the minister an uninterrupted view. The windows are glazed with cathedral tinted glass, the margins being of crimson coloured glass, in leaded quarry lights. The building is heated by hot water, and has been erected by Mr. John Stringer, of Sandbach, under the superintendence of the architect, at a cost of £1900, including fencing. The total cost, inclusive of the land, however, is upwards of £2300.

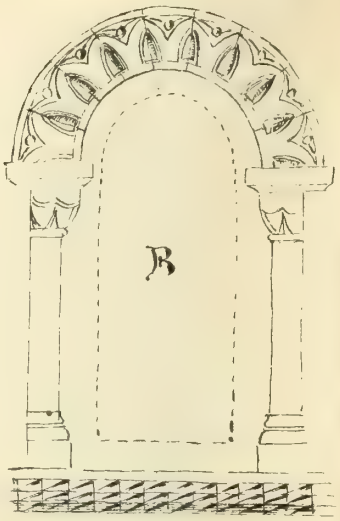
L INSTITUTE OF BRITISH ARCHITECTS.

AT a special meeting of the Council held on Monday, the 14th March, 1870, it was resolved "That it having been referred to this Council to advise a member whether he is bound to comply with a requisition to give up all the contract plans and drawings of a building (to which he had acted as architect), and all other papers necessary for affording a complete knowledge of the building and of the works carried on in connection therewith, the Council express their most decided opinion that the rule and custom of the profession is that all the drawings and papers of an architect prepared for the purpose of erecting a building are, and remain, the sole property of the architect."

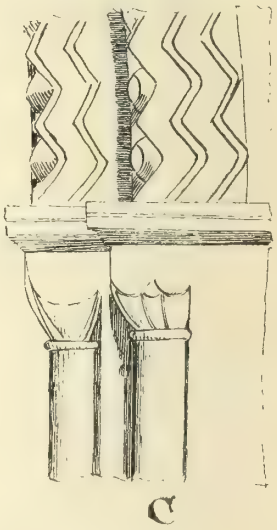
Presentation Clock for S. Saviour's, Haverstock-hill.—A lady and gentleman have presented to S. Saviour's Church, Haverstock-hill, a church clock, in commemoration of a deliverance from danger which occurred last autumn in the neighbourhood. It is executed in polished oak, and stands 3ft. 6in. high, exclusive of brackets and finial, and 3ft. wide at springing. The ornaments are inlaid with brass, as also an inscription plate at the base. It has been specially designed to suit the requirements and style of the building, by T. W. Tobin, and the clock is of the best description, machine made, by Streeter, of Conduit-street.



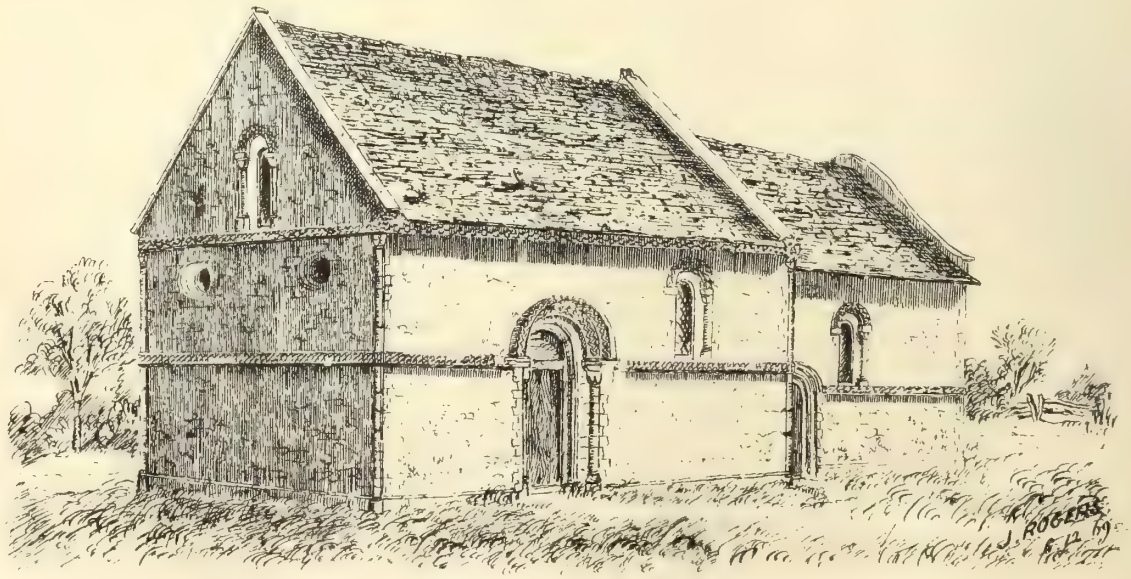
A



B



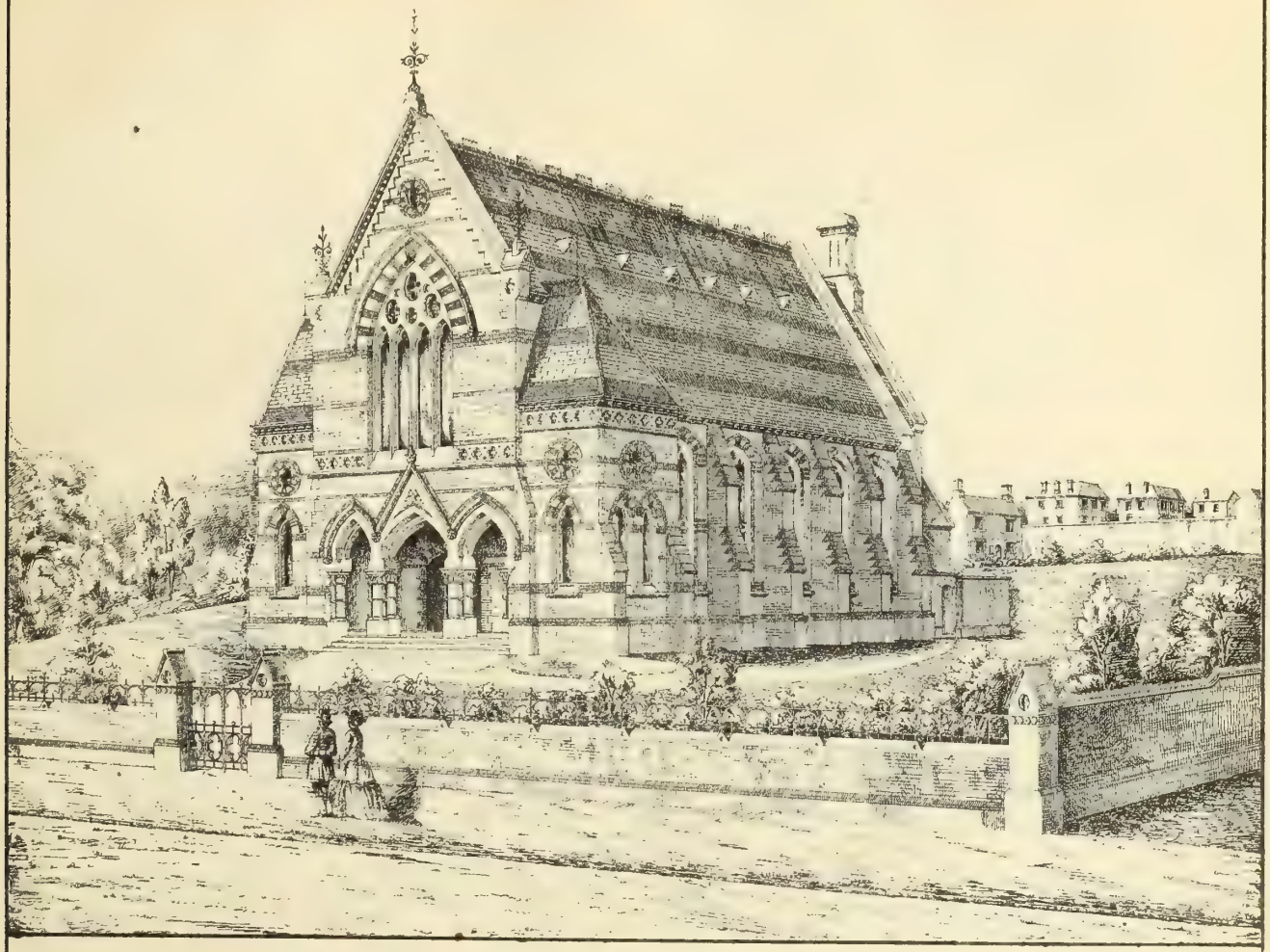
C



South West View of St Mary's Chapel, Barnwell, Cambridge.

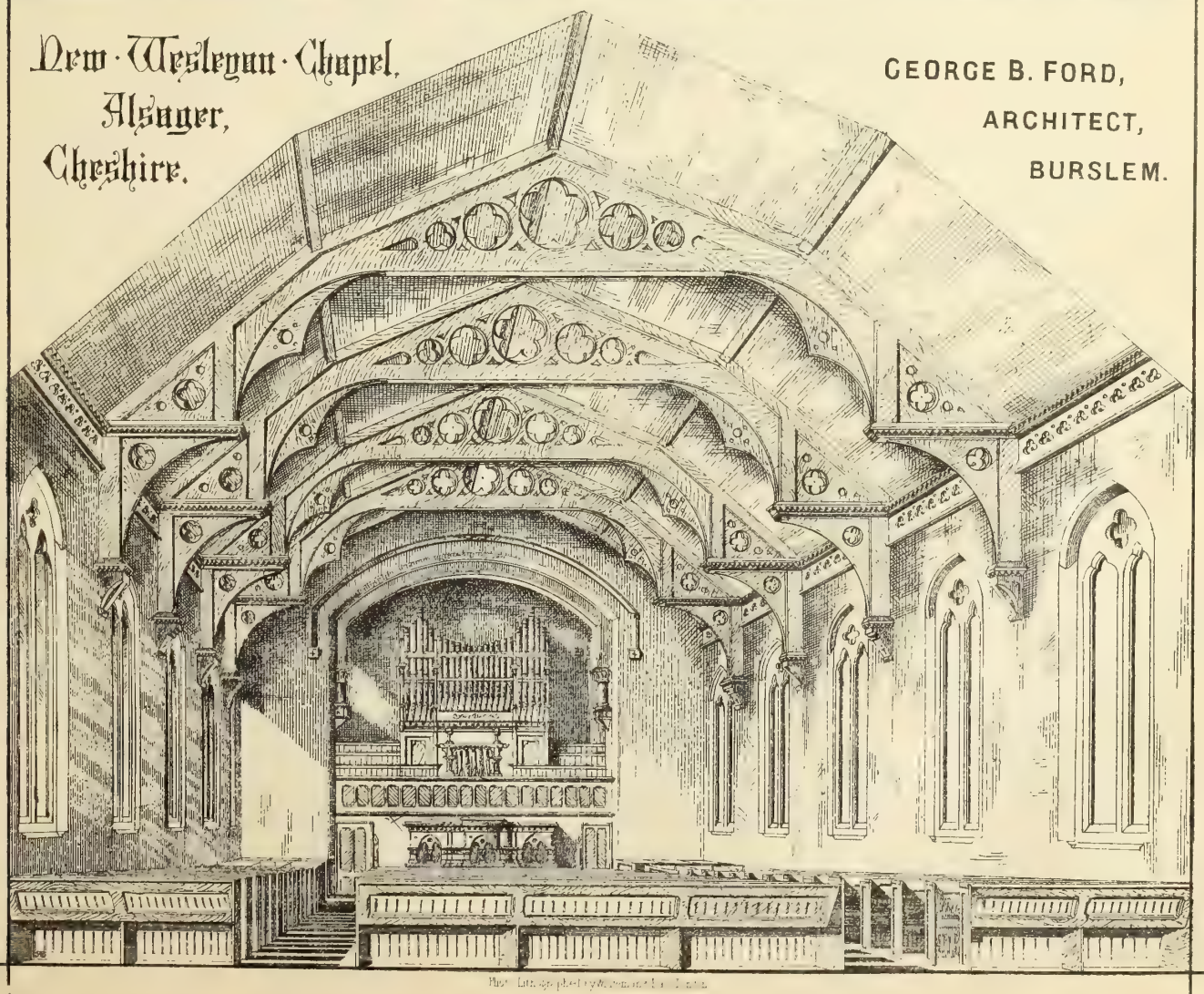
A. South Doorway · B. Window on North Side · C. Part of Chancel Arch.

Photo Lithographed by Whitehead & Co.



New Wesleyan Chapel, Alsager, Cheshire.

GEORGE B. FORD,
ARCHITECT,
BURSLEM.



BRIEF CHAPTERS ON BRITISH CARPENTRY.

By Thomas Morris.

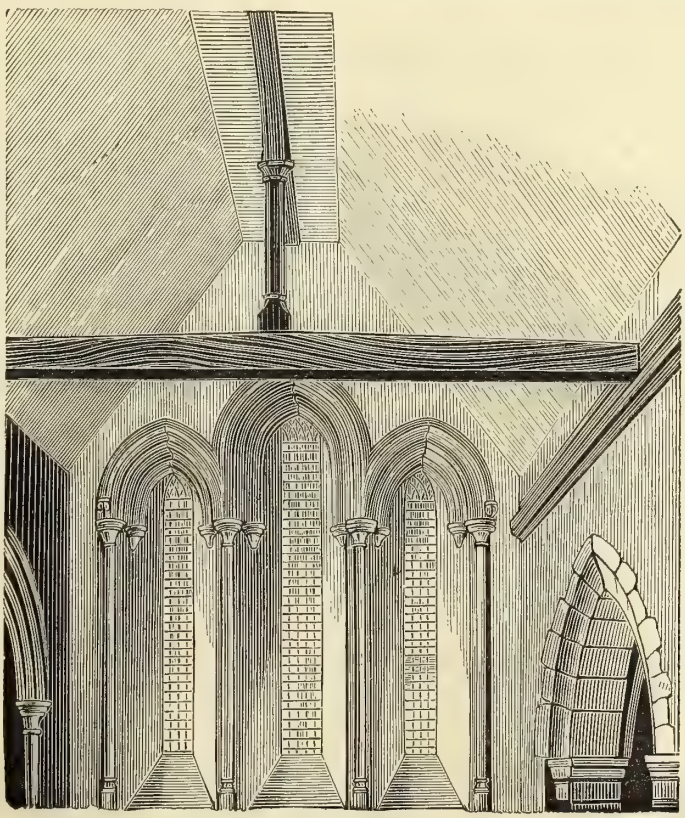
(*Continued from page* 246.)

REVERTING to the illustration on page 233, one is reminded that Coventry was an affluent and most picturesque city, rich in its cathedral and other foundations, and in buildings where woodwork was applied in a very ornamental way. After the destruction of the cathedral by order of Henry VIII., the early monastic works appear to have been to some extent incorporated with later constructions. Whether the object under notice had fulfilled any previous purpose is unknown, but so far as accounts reach, it is of later origin than I supposed. Near S. John's Church is Bablake Hospital, founded in 1506, by Thomas Bond, who had been mayor in 1497. His charity was included in the dissolution of guilds in 1547, but Edward VI. granted it in the following year to the bailiffs and commonalty of the City. Half a century later one Thomas Wheatley became suddenly wealthy, through the accidental consignment to him from Spain of a quantity of cochineal and casks containing ingots of silver, which the outbreak of hostilities may have kept from being reclaimed. He was by this means enabled greatly to aid a school for boys, commenced by the municipality in 1556, and now admitting seventy scholars, who are clothed in the costume of the sixteenth century. Thus in a fitting proportion Coventry reflects the custom and usefulness of the great metropolitan establishment of Christ's Hospital. The section is made through the boys' living room.



Interior of the Hall, Nursted Court, Kent.—(Described last week.)

It will be convenient here to take another retrospective glance. I should be glad to see erased from the terminology of early carpentry the words *tie-beam* and *truss*, in connection with it, as they are calculated to engender false impressions. When it is desired to bridge a rivulet, the simplest means of all is to throw a tree from bank to bank. If the tree be squared it becomes a beam, but nobody in the world I suppose would think of calling it a "tie-beam." What would be its relation to the banks? It would neither draw them together nor push them asunder, but would be a load, consisting of its own weight, plus that of any object upon it, and this weight the banks would have to support. The old word for a beam was summer, equivalent to the Latin *trabes*. The Oxford Glossary adduces from an indenture at Salisbury, 1445 "and every somr yn brede XVI ynches." It is obsolete, except in the compound *brest-summer*, which indicates a beam flush with the face of the work it sustains, and is familiar to us as the support for front walls over shops. Such beams, in other situations, are known as *girders*. They are employed for their power to bear a cross strain, and convey a load to supports under their extremities. This is precisely the action of beams in old roofs. At their middle stood the *crown posts*, performing just the same duties as at Nursted. An instance of this is met with at Minster Church, in the Isle of Thanet, my sketch of which is here engraved. Minster belonged to S. Augustine's Abbey at Canterbury, and frequent notices may be found of agreements between the abbots and archbishops concerning the place, but little relative to the building. In 1176, the tenants of the halimot agreed to cop their corn and pay tithes as amply as they had ever done since the dedication of the Church of S. Mary, of Menstre. (Hasted). But the present building is evidently of the thirteenth century, and very similar forms exist at Barnwell, Cambridge, engraved in le Keux's memorials, and attributed to that date.



Beam and Crown-post in the Chancel at Minster.

The beam was viewed as something to build upon, just as the stone arches were. In the old Chapter House at Ely, which was a square room, there were four piers on an inner square, from which arches turned in each direction supported a flat ceiling in nine compartments (Bentham's Ely). A *tie* intimates a pulling, but the old carpenters never knowingly subjected timbers to a tensile force, and tensile action is at the very root of our modern notions of a *truss*. That arches were deemed the proper supports for roofs may be seen in the nave of S. Martin's, Leicester, about 1350, and noticeable for its fine mouldings. The aisles also of that and many other churches have archiform supports in wood, and several are given in "Brandon's Roofs." It was as a beam and not as a tie that the foundation timbers of the cathedral roofs were employed and it is the only way to justify their dimensions. It was as struts to resist compression by an outer force, and not as braces to draw other timbers together or suspend them, that the several parts of ancient roofs were applied. It was the fact of the beam being a foundation to build upon that led to its being dispensed with. "We find," Mr. Street observes, "that our old architects were constantly varying their designs, with the object of improving the construction of their roofs, and very often with a view to dispensing with the horizontal tie-beam, which in many cases was evidently felt to be an eyesore."

To the desire for avoiding the horizontal beam and its depressing effect, we are indebted for the most truly artistic examples of carpentry ever displayed, and wherever art has been promoted there ought to be no miserly consideration of cost. At Long Stanton, near Cambridge, a church with a total breadth of about 30ft. is divided into a nave some 14ft. in width, and side aisles. There are four sets of rafter bases, and the usual level and raking struts, but no tie. There was a very ample quantity of material, but it was openly shown, and probably attracted deserved admiration at the time of its erection. In roofs that were wholly shut out from observation by stone vaulting, "forests of timber" are found, and the very exuberant use is extolled by some architects of the present day, as evincing skill and honesty not paralleled in modern times; but we are bound to reflect that what was perfectly honest and even skilful in the fourteenth century, would not disarm a casuist

of the nineteenth, and the professional enthusiast who, without first ensuring the connivance of his employer, should expect credit for concealing in the loft of some edifice an enormous and unnecessary amount of fine timber would be likely to find himself the hopeless defendant in an action for damages.

INTERNATIONAL EXHIBITION FOR 1871.

OUR readers are aware that efforts are being made for the purpose of holding an International Exhibition next year. We suppose that the notion has not been taken up very enthusiastically, as it has been necessary to hold what was called a conference to promote the exhibition, at the Society of Arts, under the presidency of his Royal Highness Prince Christian, on Wednesday last. A respectable sprinkling of first-class men attended, but for anything that was suggested, the meeting might not have been called. Whether the speakers were overwhelmed with the presence of a prince of the blood, or whether they said nothing because they had nothing worth saying, we cannot tell. Certainly the whole affair was flat, stale, and unprofitable. His Royal Highness Prince Christian made a few observations, which were certainly not distinguished for originality or eloquence. After a few questions from Mr. George Godwin, Mr. Millais, and others, as to the financial prospects of the undertaking, lighting one of the picture galleries, and insurance of the pictures, and a few rambling prosy remarks from Professor Westmacott about nothing in particular, and sundry other remarks of the same quality from Mr. S. C. Hall, which somewhat smelt of the shop, the Lord Chancellor rose and delivered a speech which contained two or three good points. In fact, the Lord Chancellor could not speak for ten minutes without saying something worth listening to. The chief point of his speech on this occasion, however, was laudation of his Royal Highness Prince Christian, for deigning, in the plenitude of his generosity, to preside over the meeting. To speak plainly, as impartial and unprejudiced observers, we could come to no other conclusion than that the meeting was pretty much of a farce. Either the meeting should not have been called, or when it was called, something more should have been done. In saying this, we are not influenced by any unfriendly feeling. In fact it is quite the reverse. Now it is decided to hold an International Exhibition next year, we wish to see it a great success. It will not be, however, if opportunities are trifled with, as was the case on Wednesday last. We shall expect more satisfactory things in future from Col. Scott and Mr. Cole. But to do a thing well, and particularly such a thing as an International Exhibition, it is necessary that the spirit and form of flunkeyism should be put under foot.

OWENS COLLEGE, MANCHESTER.

THE design for the first portion of the new buildings for Owens College is now complete, and the works themselves will shortly commence.

The site is about a mile to the south of the centre of Manchester, on the west side of Oxford-road. It is bounded on the north by Coupland-street, and on the south by Burlington-street. At its east or Oxford-road end it is some 120 yards in width.

The original idea was to make the buildings surround a large quadrangle, but this idea has been modified, it being found that the cost of the work would exceed the means at the disposal of the committee; and it was considered by them that the present requirements of the College would be more conveniently met by the erection of a compact range of buildings, with space behind for less sightly, but not less necessary structures, and in front for others of a more ornamental character, which will doubtless soon be required.

The design about to be carried out, and which we have now to describe, has been brought to maturity after long and careful consideration on the part of the committee and professors, in conjunction with their architect, Mr. Alfred Waterhouse. The scheme consists of a main block of varying width, and upwards of 300ft. in length, set back about 200ft. from Oxford-road, and running parallel with it. It is intended that this should ultimately form the western side of a quadrangle or court, 200ft. in length by 100ft. in width. The three other sides will not be enclosed at present, but when the entire scheme is carried out, there will be a natural history museum on the south, a library, examination hall, and other departments on the east (Oxford-road front), where the chief architectural features would be introduced; while to the north there would be space for additional lecture and class rooms, or for the medical school.

At the rear of the main block is a large space of irregular shape, averaging 200ft. in width, on the south of which (Burlington-street side), the chemical laboratories will also be at once erected in a detached building, hereafter described; while on the north ample space will be left for an extension of the laboratories, if needed, for various subsidiary buildings, and for a gymnasium.

The main block, containing as it does the various lecture rooms, class rooms, &c., has been planned so as to secure the maximum of the three essentials—light, quiet, and airiness. Wherever possible the class rooms turn their back upon Oxford-road, which is always busy and noisy, while a wide corridor of communication runs along the building on that side. On the basement floor this corridor is unbroken. On the upper floors it is cut in twain in the middle by the library on the first floor, and by a large arts class room on the ground floor.

This division of the corridors has been devised, amongst other reasons, to prevent their being used too freely for general traffic. Each half is approached by a separate staircase, entered from a porch on the east side. On special occasions, however, or whenever required, the whole of each floor can be thrown *en suite*.

In arranging the accommodation one important consideration has been kept constantly in view. Inasmuch as the requirements of the College may vary—one department needing an increase of space, another requiring less, the rooms have been so arranged as to be put to different uses, if need be, without any structural alteration whatever being involved. As the full development of the scheme is reserved for the future, some ingenuity has had to be exercised to make temporary provision for wants which will be more adequately met, when the whole of the buildings contemplated shall have been erected. Thus one large arts class room, not required as such at present, will be used as a temporary library. Another large room, in the basement, will form a temporary dining-hall.

The slope of the ground has favoured the arrangement of the basement story as planned. On the western side its floor is above the level of the ground. On the eastern side the rooms will look into areas 26ft. wide, so that the story is practically entirely above ground. On this floor will be placed the engineering workshops and museums, the students' temporary dining room and common room, the natural philosophy workshops, rooms for students' boxes, lavatories, cloak rooms, &c., &c.

The southern extremity of the building is devoted on the basement and ground floors to the chemical theatre, a room 66ft. by 40ft. The professor's table is at the western end on the level of the basement floor. The floor of the theatre rises eastwards until it reaches the level of Oxford-road. This room will be lit by windows on the south and west sides, all fitted (as well as those at the natural philosophy lecture room) with iron shutters, to admit of the room being darkened at pleasure.

The other principal rooms on the ground floor will be the engineering drawing room and lecture room, natural philosophy rooms, a large arts class room, with rising floor, the board room, and secretary's office.

On the first floor there are three large arts class rooms, professors' rooms (which, for the most part, are common rooms), the temporary natural history museum, temporary library, students' reading room, and various small arts class rooms.

There is considerable accommodation in the roof, for which special uses will no doubt soon be found.

The chemical laboratories in the separate building already mentioned will form a block 95ft. square. There are two large laboratories, placed side by side, each of them 70ft. by 30ft., and 22ft. in height. There are store rooms below, and various subsidiary rooms adjoining the laboratories.

The professor's private laboratory is so placed as to command both the others, and there will be direct communication by a covered corridor between this laboratory and the table in the lecture theatre.

The dimensions of a few of the other rooms and of the floors may be interesting. The stories will be, except in special parts, of the following heights from floor to ceiling;—Basement, 15ft.; ground floor, 17ft.; first floor, 17ft. 6in.; rooms in the roof, 10ft. The chief exception is the chemical theatre, which averages 28ft. in height, and some of the large arts class rooms, which have been made about 22ft. high, by a little scheming in the arrangement of the floors.

The four large arts class rooms are of the following dimensions:—One of them, 40ft. by 45ft.; two, 40ft. by 33ft.; and one, 31ft. by 35ft.—that devoted temporarily to the library is 40ft. by 45ft. The students' reading room is 34ft. by 33ft.; the engineering drawing room, 52ft. by 31ft.; the board room, 37ft. by 30ft.

There are in the buildings first to be erected ninety rooms in all, of which the chemical department takes twenty-eight; natural philosophy, nine; arts class rooms, nine; engineering, eight.

Special care has been bestowed in maturing the scheme for warming and ventilating the buildings. In the sub-basement there will be hot water boilers and a steam engine, the latter to drive a fan for forcing fresh air (warmed in winter) into the corridor and lecture theatre. In the ordinary class rooms there will be openings for ventilation above the doors, and all the windows will be double hung as sashes, with a light above hung on pivots for summer ventilation, to open diagonally, so as to throw the fresh air upwards towards the ceiling.

The whole of the rooms will be warmed by hot-water pipes, but provision is made for the introduction of fireplaces hereafter, if found desirable. Fresh air is also brought into the rooms behind the coils of hot-water pipes wherever practicable.

A special flue for the extraction of vitiated air will be taken from the ceiling of each room into large shafts in the roofs leading to ventilating turrets, in which steam cones will accelerate the draught.

Separate and particular arrangements have been made for warming and ventilating the chemical laboratories. A tower has been carried up above the roof with large arcaded openings on each side, behind which a cowl will work, always presenting its mouth to the wind. This tower will bring a constant and ample supply of fresh air to the warming apparatus in the basement of the laboratory building. The smoke from this apparatus will be utilised for increasing the draught in the flue for the extraction of vitiated air. The warming of the laboratories will be effected like that of the other parts of the buildings, but from their own separate apparatus.

The style of the buildings, as might be presumed, is Gothic, of a Collegiate and early type. The walls will be faced throughout with York stone, and the roofs covered with slate The upper part of the central gable will be devoted to a clock dial, and over the centre roof will rise a lofty fleche to be used for purposes of ventilation. A similar feature, but lower, will rise over the chemical lecture theatre. Square headed windows are the rule, except in the corridors and staircases, where they are pointed.

Internally, the most interesting architectural features will doubtless be the staircases, which are arranged in large octagonal bays, 33ft. by 14ft., and cut off from the corridors by arcades of double columns.

The floors of the buildings throughout will be fireproof, on the Dennett-arch principle.

Railway Bridge over the Dnieper.—A railway bridge which has just been completed over the Dnieper, near Kiew, is one of the greatest works of the kind in the world, and is said to be the longest in Europe. It consists of 12 arches, and is 3503ft. in length. Captain Von Struve, who built the bridge, has been promoted to the rank of colonel by the Emperor of Russia, on the recommendation of the minister of Public Works.

Furniture & Decoration.

COLOURS USED IN DECORATION.*

By an Experienced Workman.

OF reds we have a still greater number, the most useful of which are vermilions, Indian red, burnt ochre, Venetian red, and the cochineal and madder lakes.

Vermilion is a sulphuret of mercury, which is both found in a native state and produced artificially; both are permanent colours, and vary in tint from dark red to bright scarlet, and are of immense value for all decorative purposes; they may be used pure or mixed with white, both as oil and water colours, forming innumerable gradations of tints of pink, which harmonise well in combination with other colours. Vermilion is much adulterated; the native vermilion of the Chinese is considered the purest. We were examining some imitation vermilion the other day from a French house, and we should have had much difficulty in distinguishing the false from the true except by actual use; the price was less than one half the cost of the pure colour, but it is not permanent.

Indian red is a peroxide of iron, a rich dark red of a purple hue, with a powerful body, and very permanent when pure. Many valuable tints of a murrey and lakey tone may be had from it by mixing with white alone, useful for colouring large surfaces, which harmonise well with other colours. There is a pure, sweet tone in them, and an absence of pretentiousness about them, which cannot be got from any other colour. By adding blue or black we get another series of tints of warm or coal greys, as the red or the blue predominates, all of which are indispensable to the decorative colourist. It is also a useful colour for neutralising greens. Pure tints of green can seldom be used on large surfaces in interior decoration, on account of their exceeding brightness; but if a little Indian red is used with them a most valuable set of tints may be made for wall surfaces, and if the green is still further reduced by adding black with the red we have a still more useful series of neutral tones for dining-room and staircase walls. Indian red is also invaluable for using in the imitation of several red marbles, and when used alone is a good colour for many purposes; mixed with black we get chocolate.

Venetian red is a common red ochre, useful for mixing common colours, and for ground colours for graining mahogany upon.

Light red, or burnt Oxford ochre, is useful for making many tints of flesh colour or salmon colour. It also forms a good ground for graining mahogany and other red woods upon.

Of the lakes, the most useful for our purposes are purple lake, crimson lake, and Victoria lake, but unfortunatëly none of these are permanent colours. The madder lakes are all permanent colours; rose madder, purple madder and orange madder, are indispensable in the painting of flowers, birds, and coloured ornament, but are too expensive for common use. This is to be regretted, they being the only permanent transparent reds we have. Both purple and crimson lakes are useful for making a certain class of tints, but their evanescent nature causes the decorator to be very chary of using them, and it is better to put up with a somewhat inferior colour than to use one we know will shortly vanish.

Victoria lake is a rich, dark, transparent colour of a peculiar tone, and is only useful in the graining of mahogany or other red woods, but for that purpose it has no equal. The rose madder lakes vary in colour from pure pink to the deepest rose colour, and are the most beautiful and nearest to the natural colour of the rose of any colours which have yet been discovered; all the other red lakes are poor in comparison; where expense is not a consideration, many beautiful and useful tints for use in decorative colouring may be made, and for glazing in the painting of flowers and ornament it is invaluable. Purple madder is a rich deep purple, of good body, durability, and transparency. It is useful for glazing and for making tints of a beautiful and pure purple hue; its use in other respects will be evident.

Of brown pigments we have a great number, and as every warm colour mixed with black will make a brown, we have an endless variety; but there is no necessity for mixing, as we have so many ready for our use of all shades, the principal of which for our purpose is Vandyke brown, raw and burnt umber, asphaltum, and black japan.

Vandyke brown is a species of bog earth of a fine deep transparent brown colour and good body, durable both in oil and water-colour, but a bad drier in oil; it must consequently be forced when used in oil by adding sugar of lead or other drier, or else used in varnish or japanners' gold size; when ground in water, it is invaluable for imitating mahogany, walnut, maple, rosewood, and other woods, both in graining and glazing. We have also used Vandyke brown with great success as a wood stain for church work, as follows:—Let the Vandyke brown be ground fine in water, then thin down to the required depth of stain with water alone, and brush this over the work. When it has stood a minute, so as to allow time for the colour to sink into the pores of the wood, but not to dry, use a damp rag or chamois leather, and wipe off as much of the stain as you can. If this is done properly, the wood will be left a clean even stain, not showing any marks of the brush, as is the case in many so-called stains. The wood will then require two coats of clear size in the usual way, and one or two coats of varnish, as may be desirable.

Raw umber is of a deep yellowish-brown colour, very useful for general work. In mixing stone colours, and for making oil and water-graining colours for oak and other woods, Turkey umber is the best and richest umber we have, and, when burnt, becomes of a dark brown hue, almost as deep as Vandyke brown, but with a reddish tone. It mixes well with white, both in oil and water, and many warm rich tones of stone colour and drabs may be made by adding a little black. As a graining colour in oil for dark oak it is invaluable. Burnt umber and Brunswick green make many shades of good warm brown colour, which may be varied by adding black and red. Black japan is a very rich brown varnish, principally made from asphaltum. Asphaltum is a valuable brown, but is a bad drier, and has other bad properties, therefore, we prefer to use black japan, which is a good and quick drier. It may be used as a black for many purposes, as when sufficient body is laid on, it becomes a glossy jet black, but we mention it here principally for its value as a stain for deal or pitch pine in church work, or whenever the wood is left unpainted. The black japan only requires to be thinned down with turpentine to the required depth of stain and laid on the work with an ordinary paint brush, taking care to lay it as even in colour as possible. The work will then only require varnishing in the usual way. If a darker colour is required, two coats of the stain will effect this object. By this system the use of size is avoided, which is always objectionable, as it is liable to crack the work, and sometimes peel off. Of blacks we have a variety—ivory black, blue black, lamp black, vegetable black, and a patent black of recent introduction, we believe of French manufacture; it has the advantage over ordinary blacks that it does not require grinding, but may be mixed at once from the powder with boiled oil, and dries well without any driers being added to it. It is of a jet black colour, and its introduction is a great boon to the trade.

Blue black is of great service for staining whiting for whitening ceilings, and for use as a graining or glazing colour in imitation of walnut, rosewood, and other woods. Drop black is a jet black, of great service either in oil or water colour, and may be used with advantage ground in turpentine, with a little japanners' gold size added, just sufficient to bind it. It will dry a dead black colour, which, when varnished, will have a smooth glassy surface, much smoother than if oil black is used. Lamp black is principally used for common painting. Ivory black and vegetable black are only occasionally used, but are of service for many purposes, which need not be here specified.

It will be evident that the colours named above are only a tithe of the number manufactured for the use of the painter and decorator, but we believe them to be all that is really essential in carrying out any style of decorative colouring. For special works of a high class the artist's colourman will furnish every requisite.

* *Concluded from page 251.*

NORTHERN ARCHITECTURAL STUDENTS' SOCIETY.

SINCE we noticed the formation of this society in our journal of December 17th, 1869, the members have not been idle, and have got their arrangements into good working order. On the date to which we have just referred we stated that some of the students thought it desirable to amalgamate with the Northern Association, a body consisting of the practising architects of the district, and had given notice of motion to that effect. That proposal was rejected by a large majority at the meeting held on Jan. 18th, 1870. The Literary and Philosophical Society of Newcastle-on-Tyne, with its customary kindness and liberality, has granted to the Architectural Students' Society the use of one of its rooms as a place of meeting. We have received a copy of the rules of the society, from which it appears that the means proposed to be taken to attain the objects desired are the reading of essays and discussions upon them, competitions in design and construction, and visits to old buildings, or new ones either completed or in course of erection.

In accordance with these rules the following work has been done, in addition to the delivery of the inaugural address, which we previously noticed:

Jan. 18.—A paper on the "Studies of a Young Architect," by Mr. W. S. Hicks, read and discussed.

Feb. 1.—A paper on "Landscape Gardening," by Mr. W. Bedlington, read and discussed.

Feb. 15.—A paper on "Decoration," by Mr. C. Hall, read and discussed.

March 1.—A paper on "Villa Architecture," by Mr. J. H. Morton, read and discussed.

March 15.—A paper on "Domestic Architecture," by Mr. Joseph Oswald, read and discussed.

March 26.—The first out-door meeting of the society held at Seaton Delaval Hall, advantage being taken of the usual Saturday half-holiday.

Seaton Delaval Hall is situated seven or eight miles north of the Tyne, and about one mile from the sea shore. It was erected at the beginning of the 18th century from the designs of Sir John Vanbrugh. It consists mainly of a centre and two wings, forming three sides of a square, and is constructed entirely of stone, which has now acquired an excellent grey tint. A continuous arcade or cloister extending the entire length of each wing produces a fine effect. The style adopted is, of course, that species of Italian Renaissance which prevailed during the reign of Queen Anne. It is most skilfully treated; the façades are noble and impressive, and the mass is well "broken up" without deteriorating from its grandeur. The great fault in the central portion (*the* Hall) is the plainness and baldness of the flank staircases as compared with the rest of the building. The architect may possibly have arranged these intentionally in order to "throw out" the other parts, but, if so, the attempt has been carried too far. Lack of funds may, however, have compelled Vanbrugh to curtail his ornament. The central building was almost gutted by fire in 1822, and, with the exception of a new

roof, no restoration has been made. Sufficient remains, however, to indicate the splendour which must have characterised the interior; for instance, the marble floors, the massive fireplace in the great hall, the draped statuary, the ironwork and painted decoration yet visible, and the oak and mahogany panelling of the rooms. The entire building may be described as massive, picturesque, and varied in outline, although a carelessness in the management of details is here and there visible. Within the grounds of the hall stands an ancient church dating from the Norman period. The chancel arches are very fine and rich specimens of that style; indeed, the structure is one of the most interesting examples of the Anglo-Norman era extant in Northumberland. Churchwardens have been at work, alas! here as elsewhere, and have ceiled the nave with plaster, and inserted a Decorated window in place of the Norman east window, thus marring the effect of the chancel. Some pieces of armour, together with the tattered pennons and banners of the Delavals, are hung up in the church, and two effigies (one of a knight, the other of his ladye), fill up the western angles of the nave.

The excursion to Seaton Delaval will, it is hoped, be the first of a long series.

PARLIAMENTARY NOTES.

Decoration of the Central Hall.—Mr. A. Guest, on Friday last, asked the First Commissioner of Works whether, adverting to the statement of the First Lord of the Treasury respecting the difficulty of deciding on the completion of the decoration of the Central Hall, it was the intention of the Government, before coming to a conclusion, to consult the architect of the Houses of Parliament, from whose designs the works have been commenced.—Mr. Ayrton: I have to observe that it would be quite premature to appoint any person to approve of works until the Government have determined to prosecute them.

The Architect of the Houses of Parliament.—Mr. Tipping asked the First Commissioner of Works if it was true that he had demanded of the architect the drawings of the Houses of Parliament; and if he was aware that the Royal Institute of British Architects had declared that such a demand was not in accordance with professional custom, according to which such drawings were the property of the architect.—Mr. Ayrton: It is correct that I have asked Mr. Barry to deposit in the office of the Board of Works certain plans prepared by him for the public service. It is also correct—at least I have been so informed—that certain architects have resolved that they are entitled to keep plans that they have prepared for other people who have paid for them. I have referred all the papers to the usual legal advisers of the board, in order to ascertain what the rights of the Crown are.

House Tax.—Mr. Alderman Lawrence moved on Tuesday "That the house tax is unequally and unfairly assessed, imposes unnecessary restrictions upon the construction of buildings specially adapted for the working classes, and ought to be repealed." Sir Sydney Waterlow and the Corporation of London, in erecting some houses for the working classes, had had them built without front doors, and on that account they escaped the tax to which other buildings of the same class, provided by Miss Coutts and the Trustees of the Peabody Fund, were liable. It might be said that 9d. in the pound was a very small amount, but the remission of that amount would be felt, and the removal of the restrictions would be a great relief. He would now take them to the baronial residences and mansions of the rich, which were scattered throughout the country. By the law only an acre of land could be taken as a curtilage of one of these houses, and it might happen that there was no one ready to take a house of that kind, and so it came to pass that houses which had cost £200,000, £300,000, and even £500,000, were rated at only £200, £300, or £500 a year. He knew many instances of that kind, but would refrain from mentioning them. Two friends of his had each spent about £20 000 on a mansion, and one was rated at £60 and the other at £80 a year. Adjoining these was the house of a noble proprietor who had just expended £100,000 on improvements of his mansion, and it was rated at £100 a year. When they compared this with the fact that the rooms of the poor in the metropolis were rated to the full, he said this case was unequal, unjust, and unfair. Then this tax was not levied in Ireland, the Irish people having succeeded in getting it abolished in 1822; and he could vouch that in Dublin people were lodged much better than those of the same class in England. But the middle class had a grievance of their own in respect of this tax, for while the large manufactory escaped, the small manufactory had to pay if it formed part of the house. Then—and he wondered the teetotallers had overlooked this—while private houses paid 9d., beer-shops and public-houses paid only 6d. The Chancellor of the Exchequer considered that the working classes were but lightly taxed. It was true they did not pay income tax, and that they escaped taxes on luxuries; but the bulk of the indirect taxes—the taxes on spirits, tobacco, malt, sugar, tea, and coffee—were paid by them.—Mr. T. Collins seconded the motion.—Mr. Stansfeld admitted the force with which his hon. friend had discussed the subject, but thought that his arguments had fallen far short of the sweeping conclusion at which he had arrived—namely, the total repeal of the house-duty. The tax was only imposed upon houses at and above the value of £20 a year. He quite admitted that they might have an improved mode of assessment, so as to make the tax more just in its incidence. The assessment for the house-duty was not nearly so much as that for the window-duty, for which it was a substitute. He did not deny that there was some injustice and inequality pertaining to the tax, but that attached to almost every assessed tax, and he must show that this was an exceptional one in that respect. He could not anticipate the Budget, but on the whole he did not regard this tax, which was after all one of the fairest of direct taxes, as a bad one, nor could he hold out much hope of its repeal.—Mr. Alderman Lawrence then withdrew the motion, observing that the answer of the minister was an admission of the whole case, and he did not suppose that the tax would long continue to exist.

The Works of the Serpentine.—Captain Dawson Damer asked the First Commissioner of Works if, while the works of the Serpentine are still in progress, it would not be feasible, and even expedient, to take steps to render the borders of the lake more picturesque, and to do away with its tank-like and rigid outlines, which extend up to Kensington-gardens bridge, by throwing out promontories here and there, and, if possible by creating an island, and as material was now at hand the expense could not be very great.—Mr. Ayrton said the contract for the works of the Serpentine was made before he took charge of the office he now had the honour to fill. When his attention was called to the matter it undoubtedly appeared to him that the margin of the Serpentine would be somewhat of a formal character, and he therefore requested the engineer, as far as he could consistent with the contract, to make it a little more ornamental. It was impossible to make any serious changes in the contract without leading to a very large increase in expense and to competition; and therefore he had not thought it advisable to re-open the contract to that extent. With regard to the "mud" that had been taken out and deposited in the place from whence the gravel had been excavated, he could assure the hon. gentleman that the subject had been very carefully considered by the engineer, Mr. Fowler, before he recommended that mode of carrying on the works. To remove the mud would double the expense of the work, which had already cost £5000; but there was no reason to apprehend that it would in any way prove injurious to health. As to the drainage, that had been carefully looked to and provided for.

COMPETITION.

The New Lambeth Workhouse.—Mr. Henry Currey, of Norfolk-street, Strand, the professional referee on the designs sent in in this competition, has (according to the *South London Press*) decided that the best designs, as regards the several internal requirements, simple arrangements, and consistent architectural character, are those submitted by Mr. Robert Parris, Messrs. Foulsham, Giles, and Biven, and Messrs. Tyler and Ashdown; the degrees of merit are indicated by the order in which the designs are named. Mr. Parris is, therefore, the architect selected, and the two other firms will receive premiums.

The Hanging Committee of the forthcoming Royal Academy Exhibition will consist of Messrs. C. Landseer, in the place of Mr. Sant (as formerly announced), Hook, and Elmore.

ARCHITECTURAL PLANS.

Anent Mr. Ayrton's reply on this subject in the House of Commons, reported in our last, Mr. E. M. Barry writes to the *Times* as follows—

"As I have offered to comply with Mr. Ayrton's request, unusual though it be, to give him my drawings which I have prepared for the Government during an engagement which has now lasted ten years, I imagine some error must have occurred in reporting the above answer. It describes inaccurately the demand that has been made upon me, the nature and extent of which (and the peculiar circumstances under which it has been preferred) will be apparent when the papers which have been moved for on the subject have been laid before Parliament. I may add that I agree with Dr. Percy that arrangements should be made to furnish those in charge of public buildings with all necessary information respecting them."

The following is Dr. Percy's letter in the *Times*:—

"Sir,—You will learn from the reply of the First Commissioner of Her Majesty's Works and Public Buildings to a question put to him in the House of Commons to-day, that the Office of Works is not in possession of plans showing the details of the construction of the Houses of Parliament. The want of such plans has caused great inconvenience and expense, as the following facts will demonstrate. There are not fewer than 2020 flues for the inlet and outlet of air in that vast edifice: and in order properly to regulate the ventilation, it is essential that the direction of every flue should be known. But without detailed plans it is impossible in many cases to acquire that knowledge; and there were no such plans when I took charge of the warming and ventilating of the Houses of Parliament. I therefore represented to the then First Commissioner the necessity of supplying the deficiency; and, accordingly, an architectural draughtsman was employed during two years for the purpose. It required also the services of two men during a considerable portion of that time to explore the direction of the air-flues, and in some instances it was not found practicable to do so. However, correct plans of both Houses of Parliament, of all the committee-rooms, and some other parts of the building have been prepared; and nearly every air-flue has been numbered and minutely described. Whatever custom may prevail among architects respecting the ownership of plans, it is certainly desirable that the Office of Works should be careful to secure the possession of the working drawings of any public buildings which may hereafter be executed, especially of the proposed New Law Courts, in which there will be complicated arrangements connected with ventilation.

"I am, Sir, your obedient servant,

"Houses of Parliament, March 31. JOHN PERCY."

Building Intelligence.

CHURCHES AND CHAPELS.

Dingwall.—A handsome new church for the Free Church congregation, Dingwall (N.B.), is now all but completed. The building, which was designed by Mr. John Rhind, Inverness, is in the Gothic style. The principal doorway has a deeply moulded arch supported on clustered pillarets. The window heads are ornamented with geometrical tracery, and the windows which light the galleries rise above the eaves and are finished with gablets. On the north-east corner is a spire, 115ft. in height, finished with an octagonal Gothic pointed dome, which is crocketed in the angles. The church is to cost between £4000 and £5000.

Hindon.—A neat little church is in course of erection in the decayed old borough of Hindon, in accordance with directions given by the late Marquis of Westminster, shortly before his fatal illness. The foundation stone was laid recently by Lady Theodora Grosvenor. Mr. T. H. Wyatt is the architect, Mr. Miles, of Shaftesbury, being the builder.

Kilcock.—The new parish church, Kilcock, Ireland, was consecrated by the Archbishop of Dublin on the 17th ult. It has been erected at a cost of about £2000. The building, which is in the style of the 13th century, consists of a nave and apsidal chancel, measuring 65ft. by 20ft., robing room, south porch with detached round tower and spire, the latter rising to a height of about 70ft. from the ground. The nave is fitted with open benches, and affords accommodation for one hundred persons. Mr. J. E. Rogers, of Great Brunswick-street, was the architect; Mr. H. Sharpe, of Kells, the builder.

Selly Hill.—The foundation stone of a new church at Selly Hill, near Birmingham, was laid on Wednesday, the 31st ult. The new edifice, which will be dedicated to S. Stephen, will seat 300 persons. It will be nearly 112ft. long on the outside, and 30ft. wide; and the roof, open to the ridge, will rise to a height of nearly 45ft. The building will consist of nave, chancel, vestry, organ chamber, and tower and spire; but there will be no aisles. The roof will be an open-timbered one, carried on trusses, without intermediate supports. A lofty arch will divide the nave from the chancel, the east end of which will be polygonal. The tower and spire together will be about 100ft. in height. The spire is to be of timber, covered with slate and lead, arranged in ornamental bands. At the junction of the tower and spire there will be four

stone pinnacles, with stone roof running back into the spire. The church is to be built of stone, in the English Gothic style. The dressings will be of Bath stone, lined internally with the best pressed bricks. The cost of the church will be about £3000. The architects are Messrs, Martin and Chamberlain, and the builder Mr. Charles Jones.

Weeley.—On Monday afternoon the foundation stone of a new Wesleyan chapel was laid at Weeley, Essex. The chapel, which will seat 150 persons, has been contracted for by Mr. N. Saunders, builder, Dedham, at a cost of £308, Mr. John Leaning, of Guildhall Chambers, London, being the architect.

Wickham Market.—The parish church of All Saints, Wickham Market, was reopened on Friday week, after undergoing extensive restoration. Externally, the restoration has been confined to partly rebuilding the east wall, rebuilding the defective parts of the walls of nave and chancel, and restoring the stonework of doorways and windows where needed. A new north aisle has been added, and internally the church presents a complete change of appearance. The south and west galleries have been removed, and the old pews supplanted by neat benches, with carved poppy-heads. The organ is placed in the north chancel aisle, and the chancel has been raised two steps. Several of the windows have been filled with stained glass, and the font restored and removed to the entrance porch. Mr. C. E. Hakewill was the architect, and the work has been carried out by Mr. Henry Luff, contractor, of Ipswich, at a total cost of about £1400.

Wonersh.—A new carved lectern, in Spanish oak, is about to be presented by a parishioner to the church of the Holy Trinity, Wonersh. It has been executed by Mr. Ede, from a design supplied by Mr. Woodyer, the well-known church architect.

BUILDINGS.

Arundel.—Arundel, in Sussex, seems to be in a flourishing condition. There are many new buildings in course of erection in the town, and the influx of mechanics and labourers has been very great. Messrs. Myers and Son, the contractors, have now about 100 men employed in the town, and many more are expected to arrive shortly. Great difficulty is experienced in finding room for the workmen to sleep, and if their number materially increases, it is proposed to accommodate them at night in the workhouse, which is at present empty.

Bolton.—At a meeting of the Bolton Town Hall Committee, on Thursday week, a letter was read from Mr. W. Calder Marshall, the sculptor, stating that his models for the tympanum were now ready for the approval of the committee. It was resolved that a deputation of the committee should come to London to view the models in Mr. Marshall's studio, and approve of the same on behalf of the committee.

Bournemouth.—The foundation stone of the new wing to the National Sanatorium, Bournemouth, will probably be laid in Easter week. The new wing, which has been designed by Mr. Arthur Blomfield, will cost about £4200, and will accommodate 20 patients, besides containing domestic offices and two dining halls.

Cambridge.—The foundation stone of the new building for the Cambridge Young Men's Christian Association was laid on Tuesday week by Mr. W. Fowler, M.P. The building will contain, on the basement, four large rooms (to be used as committee rooms for the benefit societies of the town, &c.) and a kitchen. On the ground floor will be a library, reading-room, committee-room, and conversation-room. The lecture-room, 50ft. by 32ft., will be on the first-floor, and will be capable of seating 300 persons. The cost is estimated at £4700. Mr. Loveday is the contractor.

Smithfield.—The guardians of the City of London Union are about to erect new and more commodious offices than the existing ones in S. Mary Axe. A site has been secured in Bartholomew-close, Smithfield, at a cost of £11,000.

A Gigantic Gas Pipe.—The subway in the new street from Leman-street, Whitechapel, westward of the Commercial-road, leading to the docks, being finished, application is about to be made to the Metropolitan Board of Works to admit therein a gas main, forty-eight inches in diameter; probably one of the largest castings of the kind hitherto manufactured for such a purpose.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

GOOD FRIDAY.

The next number of The Building News will be published on *Thursday*, the 14th inst., at the usual time. Advertisers and others are therefore respectfully requested to forward all communications not later than 5 p.m. on Wednesday next.

Received.—W. E. S.—H. B.—H. J. A.—J. Faraday—R. W. A.—Maw and Co.—T. W. C.—C. H. B. H.—E. S.—John Philips—J. P. S.—C. S.—C. B. A.—G. G. S.—T. T.—P. and Sons—J. W.—T. W. C.—J. W. B.—T. P. L.—W. E. and Co.—Rev. J. W.—A. P. R.—K. and Co.—M. and J. W.

W. Hague.—Respectfully declined.

W. H.—You don't send your name. We are not under an obligation to insert every query sent us.

A. S.—Two other letters on "Architecture in the Birmingham Exhibition" appear among the Correspondence

Correspondence.

(To the Editor of The Building News.)

NEW TEMPLE STREET.

Sir,—A fine opportunity now presents itself for opening a new street through the Temple, from S. Clement's Church to Blackfriars Bridge, and thus relieving the overburdened traffic of Fleet-street. This could be done at a very trifling expense, as there is no property of any consideration for which large compensation would be required. And as regards the Temple itself, that would be easily disposed of, for there is no right to compensation at all. The public are very much in the dark as to the tenure of this place. It is, in fact, national property, and does not belong to the Corporations of the Inner and Middle Temple, but is held by them from the Crown on payment of some insignificant sum of £20 or about, as a *reddendum* or quit rent. The nation has a right to resume the land and buildings at any time, more especially as the trustees have entirely failed to fulfil the purposes for which it was granted. The Temple is, in fact, in the hands of a set of self-appointed irresponsible men, called Benchers, who receive enormous sums yearly from the admission of barristers, and from the rents of chambers in the Inn, not one farthing of which is ever accounted for to those who contribute the money; but the funds of the society are squandered away in giving extravagant feasts to princes, illustrious persons, and their own personal friends. Surely, if ever an abuse required looking into, it is the mismanagement of the Inns of Court, and I only wonder that the Minister of Finance has not long since turned his attention to this subject. The whole territory of the Temple might be sold, and would easily produce one million sterling—a sum, I dare say, very acceptable to Mr. Lowe.—I am, Sir, &c. Richard Paternoster.

March 31, 1870.

CONCRETE BUILDING.

Sir,—There have been several inquiries of late in your journal as to the use of concrete for cottage building, &c. Some correspondents have asked what method of construction to adopt in order to ensure durability and economy in their work. With your permission I will give a few particulars of two systems of concrete building—viz., constructing with solid blocks of concrete, and constructing with an apparatus. An erection by the former method, now fifteen years old, is to be seen under Windmill Hill, Gravesend, and is well worth inspection. The building named has proved the durability and the economy of that mode of construction. I would ask, has anyone had such experience in constructing concrete buildings by means of an apparatus to say that that method is the soundest and most durable? In the latter kind of construction, many builders cover the exterior surfaces of the walls with plaster, in order to hide the rough honeycombed appearance of the walls as they emerge from the apparatus. This plaster coating, owing to its bad quality or some other reason, is frequently to be seen peeling and dropping off, having a most wretched appearance, and leaving the rough surface of the wall exposed. In the method first named in this letter, the solid blocks retain the original smooth surface given them in the moulds, and are as hard and as durable as when first put up, if not more so. To say nothing of the better appearance of this mode of construction, the expense of material and labour in coating the walls reared by an apparatus is saved. In constructing buildings in concrete by either of the systems named, it would be advisable to have reliable information on the following points:—What cement to use for coating the exteriors of walls; what causes the facing to fall off after a time; what is the cause of what are called fire-cracks—is it through the expansion and contraction caused by the heat of the sun? In a house I erected at Northfleet, these cracks appeared in parts not exposed to the sun, and I incline to the belief that coating concrete buildings with cement is wrong, which, with your permission, I will proceed to show at some future time, and I will also explain what I find to be the best and simplest method of preparing and using the concrete for constructive purposes.—I am, Sir, &c.,

Northfleet. W. May, Jun.

ARCHITECTURE AT THE BIRMINGHAM SPRING EXHIBITION.

Sir,—I have perused the letter of "T. G." with no little astonishment, and with your permission would like to make a few observations upon it.

In the *first* place, by what authority does "T. G." cast a slur on the West Bromwich School Committee? Can he for a moment suppose their choice was dictated by caprice and favouritism, and that therefore there has been improper influence used in appointing Mr. Bindley?

In the *second* place, why does "T. G." indulge in such a laudatory panegyric (is he ironical?) on Mr. Proud's design for cottages, although it may be a "superior production," showing a "pleasing specimen of domestic Gothic!" I would not deny but it may be a very creditable production for a *young* architect; at the same time this "pleasing specimen," though "gained by simple (very) means," does not evince a latent Wykeham or Pugin.

I should advise Mr. Proud to make one of the *great* living (not provincial) architects his model.

Then (having left the "pleasing specimen," &c.), "T. G." rushes full tilt at Mr. J. S. Davis, whom he treats, as if "stirred up with envy (and revenge)," to a most unmerciful and unmerited disparagement. If "T. G. understood polychromy as *well* as he seems architectural criticism, I think he would not detract from the merits of a *painted* reredos for being rendered in "flaming" tints, it being impossible to be in *too bright* colours, for the following reasons, viz., whenever a *coloured* reredos is used it is in nearly, I might say every case, because the wall it is to be done on is incapable of having a window inserted (as we often see in modern town churches); therefore the light admitted from the sides or top falls in an oblique direction on the mural painting, making a brilliant tone of colour a *sine quâ non*.

But "T. G." reaches the acme of absurdity, and "out-Herods Herod" when he says art has been neglected among the numerous architects of Birmingham; supposing this true to some extent, who have we to thank for it but those pseudo architects who fritter away their own and their *readers'* time in unreasoning platitudes?—I am, &c.,

"Mens Sibi Conscia Recti."

Edgbaston.

Sir,—A correspondent, who signs himself "T. G.," thinks proper to write a criticism on the architectural drawings exhibited in this town. As he speaks *ex cathedrâ* I presume he is an architect (for none but the most conceited amateur would venture to teach architects their business, as if they, as a body, were totally indifferent to the well-being of art, and only followed it from a love of gain). He characterises the exhibition as "a feeble one," and to this I make no objection. He then implies that some unfair and improper influence was brought to bear on the committee appointing Mr. Bindley architect for the West Bromwich schools. This is a most unjust insinuation, and would naturally lead people to suppose that your correspondent was an unsuccessful competitor. He, however, recovers his good humour when he alludes to Mr. Proud's design for cottages, which I am informed is in the "*Domestic Gothic*" [style of architecture But will our delightfully vague critic explain this ambiguous definition? as he is probably aware three periods of Gothic were in vogue in the Middle Ages, and there is a further one denominated Victorian. My reredos, he says, is a *flaming* piece of composition; therefore I am really surprised that it was allowed to enter the building at all, and still more so that it is hung in immediate proximity to a pheasant and other game. In that brilliant negative style so much affected by "small beer" writers, "T. G." says "I cannot be complimented on any great success." Does he mean that I cannot be complimented at all, or that I am "condemned with faint praise?" I shall not offer any apology for my figure drawing; though, as your correspondent cuts such a sorry figure in *print*, I think I may be pardoned for a failure in *drawing*.

Your correspondent wishes that "some local architect would deliver a course of lectures on architecture." But as he himself must be an architect (judging from the general tenor of his remarks), it seems extraordinary that he has not already taken the initiative, and instructed those architects "who have neglected their art," but have at the same time adorned and beautified this and other towns.—I am, &c.,

John Statham Davis,

14, Temple-street, Birmingham, April 2, 1870.

EXTERNAL FACINGS AND DRESSINGS.

Sir,—In reply to the letter from "J. C.," permit me to say we have from time to time executed orders for glazed bricks for external purposes, though in London, where such a material is most required, only in one instance, and that by

favour, the objection being the glazed surface. If this can be overcome, the difficulty of a dirty smoked front can be surmounted, and the only way to do so is to adopt such bricks, and the objection will then be found to exist only in the imagination. If the fronts erected in the High-street at Poole, besides the house fronts in the other parts of the country, could be seen, we are convinced they would be approved, and the objection to the glazed surface would have no weight. It has never to our knowledge been noticed as a fault. The natural colour of the clay of the neighbourhood is a light buff, but we made several colours. Our price for the buff was £9 per 1000 at the works, and as 2000 would frequently be sufficient for a front in a street, the additional cost, after deducting the cost of ordinary faced bricks, or of cement and paint, would increase the first cost of the building say £10 or £12, while if compared with cement and periodical painting, they would be found the cheapest material in the end.

We tried many descriptions of surface, but are of opinion that the glaze must be as vitreous as possible, and any modification which renders it dull will not have the effect. If not smooth the dirt will lodge and adhere, and is not easily washed by the rain. If your correspondent will call at our London office in St. Martin's-lane, we should be glad to give him any further information, and show him what specimens we have, though through the imaginary difficulty of the glaze we were unable to effect sales to an extent that would make it worth our while to continue to manufacture that description of goods as at first. Light reflection is not felt to be an objection in the East, where the rays of the sun are much more powerful, and where they are not subdued by passing through clouds of fog and smoke to the same extent as in London. We are, and always have been, of opinion, that any increase in the reflection of the sun would be a great desideratum here in the favour of glazed bricks, not only in London, but anywhere in our frequently sunless and humid climate.—Yours, &c., The Architectural Pottery Co.,

Poole, Dorset.

Intercommunication.

QUESTIONS.

[1823.]—CAST IRON STANCHIONS, H SECTION.—I should feel much obliged if any correspondent could supply me with a formula for ascertaining the sectional area of an H section stanchion, the height of which is 12ft. and the working load 30 tons; also the proper proportion of web to flanges, and, *vice versa*, the dimensions of the metal being given, a formula to ascertain either the crushing weight or safe load. —J. S.

[1824.]—RETAINING WALLS.—In an article upon "Retaining Walls" in Vol. XIV. of Building News, p. 286, you gave the following reduced equation for finding the thickness of wall when in equilibrium:—

$$x = \sqrt{\frac{H^2 \times \text{tang. } 2\tfrac{1}{2}\ \theta}{3}}$$

Should it not have been—

$$x = \sqrt{\frac{H^2 \times 2 \text{ tang. } 2\tfrac{1}{2}\ \theta}{3}}$$

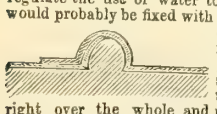
In comparing the former equation with that given by "J. S." in Vol. XV., p. 833, I found they would not agree, whilst the latter and "J. S's." gave the same results. Will you, Sir, or "J. S.," be kind enough to say which is right, as it makes a considerable difference in the thickness of walls?—A Working Man.

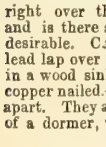
[1825.]—TERRA COTTA.—I shall feel greatly obliged to any reader of The Building News who can and will inform me if, in the manufacture of terra cotta works for building, such as bas-reliefs, medallions, moulded strings, and such like, it be necessary absolutely to cast such in moulds previously prepared from models, or whether they can be modelled in the wet clay and burnt straight away from the modeller's stool; or refer me to some reliable work on the subject, in which I can read the full details of the manufacture.—J. P.

[1826.]—CEMENT OR WOOD SKIRTINGS.—Which makes the best skirting, cement or wood, as regards durability, cost, &c.?—T. R. H.

REPLIES.

[1805.]—PLUMBERS' WORK.—"Zoff," two or three weeks ago, asked some questions on plumbers' work, which I will endeavour to answer:—1. Use of service box—Is to regulate the use of water to W.C.; if to a slate cistern, it would probably be fixed with red lead, or screwed.—2. Width of lead for covering rolls in lead flats. The lead at the rolls in good work is formed thus: One sheet laps about half-way over the roll, and the other passes right over the whole and returns again on to the flat, and is there soldered down.—3. Close copper nailing where desirable. Copper nailing is desirable wherever 2 sheets of lead lap over each other, and are exposed to any rubbing, as in a wood sink covered with lead the edges would be close copper nailed.—4. Soldered dots—how used—what distance apart. They are generally used on roofs, as in the covering of a dormer, where the lead is exposed to the action of the sun, soldered dots would be used at the lapping; the distance apart would be regulated by circumstances. I believe plumbers take pride in making a good soldered dot.—5. Joints in lead cisterns—how effected. The lead-work for cisterns is cut out as above: the sides are then folded up, some being made a little longer than others to give a lap; the junctions are then soldered.—6. Best bed for stonework in spires. Horizontal on square with the rake, &c. Horizontal beds for ordinary spires would make sound work, with plain joints properly dowelled.—W. W.





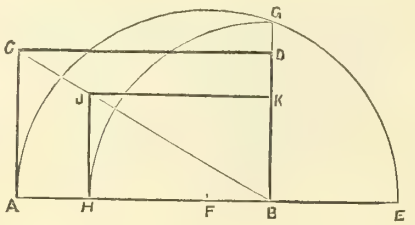
[1806.]—PRESERVATION OF RED FACING BRICKS.—"F. N." should have been told that the "patent process" prevents the change in appearance in the same way as a coat of paint would, but if I understand his question aright, he wishes to keep the colour of the facings and not cover them.—A. B.

[1810.]—BREAKING WEIGHT OF CAST-IRON BEAM.—In answer to this question I enclose the requisite formula, taking for granted that the bottom flange of the beam is 1in. thick:—W = breaking weight of beam in tons; a = area of bottom flange; d = depth of beam; L = bearing of beam in inches; c = constant.

$$W = \frac{c \times a \times d}{L} = \frac{26 \times 9 \times 12\frac{1}{2}}{168} = 17 \text{ tons } 8\frac{3}{14}\text{cwt.}$$

—F. A. H.

[1811.]—SIZE OF PANEL.—Let A B C D be the panel of which it is desired to obtain one containing half the area and



retaining the same proportion. Produce A B to E, making B E equal to half A B, find centre of A E at F, with F as centre describe semicircle A G E, extend B D, cutting semicircle at G, with B as centre describe arc G H, erect a perpendicular at H, cutting diagonal C B at J. Draw J K parallel to A B. The figure J K H B will be half the area of A B C D and of the same proportion. This rule will apply to any proportion by extending the side A B as much as it is proposed to reduce the panel, say one half, one third, one fourth, &c., and working as above.—W. P.

[1813.]—CONSTANTS OF LABOUR.—The question put by "Quericus" at first appears rather difficult to answer, and it is rather extraordinary that the "constants of labour" were not more lucidly defined by the author of the pocket-book referred to. The following explanation will answer the question of your correspondent. From the data given he desires to know the value of the labour only of a rod of brickwork, and of a foot super of Portland stone tooling. The general conditions may be thus expressed:—Let T equal the time in days or decimals of days occupied by the workman in performing the unit of work; let W equal his wages per day, and C the cost of the labour only of the same unit of work. Then we shall have the general equation C = T × W. Let us apply this practically to the cases given by "Quericus." First, for the rod of brickwork. The value of T, which includes the time of both bricklayer and labourer, is 3·5, and that of W or their united wages is 10·4 shillings. Therefore the value of the labour only of a rod of brickwork will be in this instance equal to 3·5 × 10·4 = 36·40 = £1 16s. 5d. Similarly, for the second question C = 0·13 × 6·66 = 0·865 shillings, = 10¼. The term "constants" is employed to point out that however the wages may vary, a good workman will always do practically a "constant" amount of work in the same time, which is quite true. The value of the labour depends, therefore, upon two quantities, one a constant and the other a variable. Of course in deducing the "constants" an average was taken, and not the performance of an extraordinarily good workman.—Contractor.

[1814.]—HEDGES AND DITCHES.—The allowance for the width of the ditch, as all surveyors know, varies with the local custom, which must be ascertained in the locality. With respect to the other part of the question, your neighbour may fill up his ditch as high as he likes, so long as he does not reach the level of any of your "lights." If he does this he is in the wrong box.—A. K.

[1816.]—RIGHT OF LIGHT.—Certainly; provided the privilege or right is made available before the expiration of the second life after the granting of it. No one who succeeded to the property could, for instance, cause a house that had been built in accordance with the grant to be pulled down. When a person succeeds to property he is bound to take it with all its liabilities, so long as they are legal.—Clerk.

[1819.]—INTERFERENCE WITH CLERK OF WORKS.—In reply to "Pupil," let me first explain the position of a clerk of the works, as his question proves that he is quite at sea upon the subject. A clerk of the works is the person employed by an architect to see that his orders are carried out by the contractor during his absence and to report to him immediately upon any inferior material being brought upon the works. In "Intercommunication" of 24th September, 1869, Mr. Morris very clearly and properly describes the duties of a clerk of the works. The question of "Pupil" appears to me to be whether it is legal for a master to cancel the orders of his servant, or to give instructions to other persons without his servant's consent? The question thus stated needs no reply. It is certainly customary for architects to save themselves trouble by transmitting their orders through the clerk of the works, but where they find that through the stupidity of the latter this increases instead of diminishes their trouble, the usual method is to get quit of the clerk of the works at once. Latterly, however, it has become the custom of local boards to appoint the clerk of the works. I am myself now suffering from the effect of this system. My clerk of the works was selected from amongst 50 applicants, amongst whom were merchants' clerks, shopmen, and broken down tradesmen of the locality. Very shortly I found him most grossly ignorant of everything his position required him to know, and his handwriting and spelling were something wonderful to see. I can only ascribe his election to a wise look and a happy knack of pulling his forelock in the most profound manner to every person above him in station. He neither understands drawing nor verbal orders, and I have often left him after an hour's talking with the melancholy conviction that I had not succeeded in putting one single idea into his stupid head. The result is I am obliged to be my own clerk of the works, attend the works almost daily, give my orders direct to the foremen, and with my own hands do the setting out, measuring, and book-keeping; this too on a contract of many thousands.—Architect.

STAINED GLASS.

Bungay.—A painted memorial chancel window has just been completed at S. Mary's church, Bungay. The window consists of four lights, divided by a stone transom, thus making eight compartments; in the centre of each of the lower four is a medallion containing a subject from the history of our Lord, painted by Messrs. Barlee, of London. The four upper compartments, painted by Messrs. Powell, of London, contain figures of angels playing on musical instrumentss

Nayland.—The east window of Nayland church, Suffolk, has just been filled with stained glass by Messrs. Baillie and Mayer, of London. The window is Decorated in style, and contains five lower compartments with tracery lights. In the centre opening are two groups under canopies, one of which is "The Trial of S. Stephen," and the other "The Stoning of S. Stephen." The four side openings each contain a group in medallion shape on geometrical and mosaic backgrounds enclosed within borders of purple and green flowers. The groups on the north side are "The Nativity" and "Christ Bearing the Cross;" on the left side "The Entombment" and "The Ascension."

Hemel Hempstead, Bucks.—A stained glass window has been fixed in Great Gaddesdon Church, Hemel Hempstead, in memory of the late Mrs. Moore Halsey, lady of the manor, containing the subject of Dorcas feeding the hungry, and other acts of charity, the death of Dorcas, and S. Peter raising Dorcas to life, under rich canopies, with angels on pedestals. The window was designed and executed by W. Holland and Son, Stained Glass Works, Warwick.

STATUES, MEMORIALS, &c.

Bunhill Fields.—Mr. H. T. Helyer, architect, of Bournemouth, has been entrusted with the design of a proposed monument to Mrs. Susannah Wesley, mother of the Rev. John Wesley, in Bunhill Fields Burial ground.

WATER SUPPLY AND SANITARY MATTERS.

Penrhyn.—In a report on the sanitary condition of Penrhyn, Dr. Thorne says the present drainage works are not only insufficient but structurally incapable of carrying away all the sewage. Several of the main drains, all of which empty themselves into the estuary of the river, are rudely constructed of loose stones, and many of the street gully holes are blocked up.

Bridport.—Dr. Buchanan has been sent down to Bridport to examine into the alleged non-execution of needful sanitary works there. He was sent down in consequence of a memorial addressed to the Privy Council by one of the members of the local board. The memorial stated that there had been fatal typhoid fever cases, and that the water was polluted. It appears from Dr. Buchanan's report that the place is in the same condition as it was in 1864. In that year it was reported that the place was in as bad a state as it possibly could be—bad sewers, bad drains, bad water, bad paving, masses of putrid matter lying about and poisoning the air with their exhalations being some of the characteristics of the place.

Clitheroe.—At the last meeting of the Clitheroe Local Board of Health the following resolutions were passed:—"That the Local Board apply to the Chief Constable of Lancashire to give directions for the police stationed in the borough to act as inspectors of nuisances, together with the borough surveyor, to enforce and carry out the Local Government Act, 1858, and Sanitary Act of 1866, within the borough." "That the Local Board be desired to obtain the best possible advice as to dealing with the sewage of the town, especially with a view to remedy the state of Mearley Brook."

Dealing with Sewage by Irrigation.—It must be encouraging to the advocates of this system of dealing with sewage to note that lately a Committee of the House of Commons decided, in the case of the Blackburn Corporation, in favour of irrigation as the proper method of disposing of the sewage of a town. On Tuesday week another Committee of the same House decided in favour of the same system in the case of Reading. In each of these instances the proposal to irrigate was strongly opposed; hence the advocates of the system may especially congratulate themselves on the result.

Our Office Table.

Presentation to Dr. Zerffi.—An illuminated address was delivered to Dr. G. G. Zerffi, on the 31st of March, by the students of the Birkbeck Literary and Scientific Institution. The address on vellum is a real masterpiece; the richness of the boarder surpasses anything produced in later times in this style of mediæval writing. Design varies with design, and is still harmoniously kept together by the soft tints of the rich colours so as to form one artistic whole. Mr. A. G. Clayton, the artist, has ornamented the nine shields of the boarder with antediluvian animals: pterodactyls, ammonites, ichthyosauri, protoplasms, labyrinthodons, and mastodons, crowned with butterflies, spiders, squirrels, rabbits, and frogs. The initials are serpents and dragons. The body of the address, written in black letters,

expresses the gratitude of the students of the Physical Geography and Universal History Classes to the Doctor for the care with which he delivers his lectures in order to promote a taste for the higher branches of science.

Artists' Benevolent Fund.—The 61st anniversary festival of this institution was celebrated by a dinner at the Freemasons' Tavern on Saturday. Viscount Enfield, M.P., presided. The Chairman, in giving the toast of the evening, stated that since the formation of the fund £30,812 had been distributed in relieving widows and orphans of British artists. During the past year 52 widows had received annuities from the fund, and three orphans had received gratuities. Among the subscribers to the fund were several crowned heads, including the Queen, the Emperor of Russia, and the King of Prussia, and in looking down the list of benefactors he saw the names of men illustrious in arts, literature, politics, science, and commerce. Mr. G. Godwin, in proposing "The Societies connected with the Fine Arts," expressed his opinion that in England young artists had not the same opportunities of obtaining the technical and manipulative knowledge of the painter's art as in France, where they were admitted to the studios of painters of eminence, and saw them at work. The result was that on the continent an artist began his career where in England he too frequently left off. He should be glad to see our English artists opening their studios to young students more freely. Among the other toasts were, "The President and Members of the Artists' Annuity Fund," proposed by Captain Dighton, and "The Artists' General Benevolent Institution," given by Mr. C. J. Dimond. Mr. Lambton Young, the secretary, read a list of subscriptions, amounting to upwards of £450. Among the donors was her Majesty the Queen, the announcement of whose annual subscription of 100 guineas was received with great applause.

The Shepherdess-walk Improvement.—The Metropolitan Board of Works having purchased (as previously announced in The Building News) a large portion of the ground adjoining S. Luke's Workhouse, City-road, for the purpose of widening Shepherdess-walk, workmen commenced on Tuesday last pulling down the boundary wall, and removing the old materials, so that in a week or two this long-delayed improvement will be completed, and the carriage thoroughfare from Essex-road, Islington, to the city, by way of Packington-street, thrown open to the public. It has been suggested that the whole of Shepherdess-walk, from the canal bridge to the City-road. should be called Dodd-street, or Contractor-street, as the improvement is owing, in a great measure, to the untiring exertions of Mr. Henry Dodd, the well-known contractor.

Formation of a Central School of Art for Derby.—A Central School of Art has been formed at the Derby Mechanics' Institution, in connection with the Science and Art Department, South Kensington. An influential local committee has been formed, and Mr. T. C. Simmonds has been appointed head master.

Chips.

The bridge over the Dee, forming part of the viaduct which supports the Chester and Holyhead line, is about to be entirely reconstructed.

A meeting was held in Glasgow on Wednesday week, when it was resolved to form an association to be called the "Glasgow Institute of Fine Arts," and office-bearers were appointed to make arrangements for its incorporation.

Tenders for the erection of the new Small Debts Courts for Durham have been sent in, and the building will shortly be commenced. The site is at the end of Elvet Bridge.

The Corporation of Winchester are about to erect a new town-hall.

Mr. G. Doman has been re-elected as surveyor of highways to the Basingstoke vestry, and his salary has been raised from £20 to £30 per annum.

A new organ is in course of construction for Eling Church, Hants.

The foundation stone of the new workhouse at Woolwich was laid on Saturday last.

The South Eastern Railway Company is about to proceed with the construction of the new line from Greenwich to Woolwich. The company is prepared to receive tenders for the construction of the line from Charlton to East Greenwich.

The memorial stone of new National Schools at Bickington, Devon, was laid last week.

Sir Francis Crossley has offered to give £10,000 towards the erection of a new infirmary at Halifax, on condition that the existing building shall be retained as a convalescent ward.

The surveyor to the Taunton Local Board of Health has given notice of his resignation of his office after June 24.

The restoration of the west front of Wells Cathedral has commenced.

The Church of S. Thomas, Salisbury, is to be restored, at an estimated cost of £1500.

It is in contemplation to restore the Lady Chapel at Chichester Cathedral, as a memorial of the late Bishop, Dr. Gilbert.

A numerously-signed memorial to the Dean and Chapter of Exeter is being prepared, praying them not to adopt the plans suggested for the restoration of the Cathedral, but to open the nave to the choir for public worship.

The rebuilding of S. Michael's Church, Otterton, Devon, was commenced last week.

The new carriage-drive and promenade at Blackpool is nearly completed. Mr. Sykes is the engineer of the work.

A new organ was opened at S. Paul's Church, Astley Bridge, Lancashire, on Sunday week. It has been built by Messrs. Bowes and Co., of Manchester, and cost £200.

It is proposed to erect a new dispensary, with hospital attached, at Berwick.

The corner stone of a cottage infirmary was laid at Stanley, near Wakefield, last week,

The building at present used as the London Stock Exchange is about to be considerably enlarged.

Mr. E. M. Barry wrote to the *Pall Mall Gazette* on Monday last as follows:—"Sir,—I have seen a paragraph in your paper stating that I had made an estimate for new dining-rooms for the Houses of Parliament to cost £24,000. I shall feel obliged if you will allow me to state that I have made no such estimate."

The joiners of Barnsley have struck work against a demand of the masters for one hour per day more labour.

THE TIMBER TRADE REVIEW.

If there has been any alteration during the past week it has been in the shape of slightly increased prices for some description of goods. At present, pending the fresh importations, it will be found that merchants are rather undecided in their quotations. For instance, we know of a *bona fide* sale being effected of first quality mill-sawn Archangel yellow 3 × 9 deals, at £14 10s. per Petersburg standard, and also know that precisely the same description of goods can be had at £12 10s. Again, best Onega yellow have been lately sold at £15, and in another part of the town they can be had (taking an outside price) at £14. One of our principal importers asks £13 10s. for 3 × 7 Petersburg yellow, and £10 for 3 × 7 and 2½ × 7 Wyburg yellow, but even taking into consideration the scarcity of yellow battens, the price varies very much from other offers made during the week for 3 × 11 and 3 × 9 of similar descriptions. There is always this uncertainty about prices at this time of the year, importers naturally wishing to bring their coming cargoes to a rising market, and consumers as naturally wishing to buy cheaply. Hence it is quite possible that individuals may have had offers, or have effected purchases at a little less or more than quoted in our price list, but after a careful comparison of information derived from authentic sources, it may be taken as representing the state of the market as accurately as it can be ascertained. The stock at the docks seems much lower than we have seen it at a similar period of year, for some time past, and the principal private timber yards do not seem to be at all overstocked. There seems also to be an improvement in the general quality of the remaining goods. The stock of square timber seems very small.

Now that the Easter holidays are approaching, when the South Kensington Museum will be crowded with sight-seers, it may not be unimportant to call the attention of those interested in such matters to the different kinds of wood which meet one at every turn, manufactured into different articles of furniture. For instance, the magnificent cabinet of satin wood, with plaques of Wedgwood ware, is worthy of especial study, both from the richness of the material and the excellence of design and workmanship. It contrasts curiously in its brightness with the carved walnut cabinet and mirror which stands near it. The various ancient chests and cabinets of oak, cypress, chesnut, baywood, cedar, &c., are all interesting studies, both to the timber merchant and the cabinet maker, and there may be also seen what perhaps few persons have noticed, that is a small specimen of ivy wood.

The stained deal school desks are also worthy of notice, but one specimen of desk of pitch pine polished, made by Sidebotham and Co., of Manchester, is well worth going to see, as it shows what pitch pine is capable of.

With reference to price lists, we will give a word of caution. Beware how you are guided by lists of prices taken from country papers. These are almost always supplied by a timber merchant known to the proprietors, and who consequently has an interest in keeping prices up. He is waited upon once a week with the previous week's slip for any alterations he may wish to make, and curiously enough, seldom if ever records a fall in the price of any article; being quite unlike the bakers, who forget to tell us when bread has risen, but never fail to placard their window when it is "down again."

DEFINITIONS OF FORCES BROUGHT TO BEAR UPON TIMBER, &c., AND OTHER REMARKS.

Turnbull gives the properties of timber as follows—viz., stress, strain, straining force, strength, stiffness, flexure or deflection, extension, cohesive force, elastic force, and modulus of elasticity.

1. Stress is the force excited in the material, or that power which, being applied externally, endeavours to produce fracture.
2. Strain is the effect produced by the stress or straining force.
3. Straining force—same as "stress."
4. Strength—that is, that property of bodies by which they resist breakage or fracture.
5. Stiffness is that property of bodies by which they resist bending or flexure.
6. Flexure or Deflection is the space through which a body is bent by means of the stress or straining force.
7. Extension is the quantity by which the length of a body is augmented when drawn in the direction of its fibres.
8. Cohesive Force is that property by which bodies resist the separation of their parts, and is measured by the force or weight that would tear them asunder.
9. Elastic Force is that property by which bodies endeavour to recover their original state when the straining force is withdrawn.
10. The Modulus of Elasticity is the measure of the elastic force.

LATEST PRICES OF MATERIALS USED IN CONSTRUCTION.

Timber. Duty Is. per load; Drawback, Is.

	£	s.	£	s.
Teak .....load	11	10	12	5
Quebec, red pine	3	15	4	15
,, yellow pine..	4	0	5	0
St. John, N.B. yellow	0	0	0	0
Quebec oak	5	15	6	5
,, birch	3	15	4	15
,, elm	4	5	5	5
Dantzic oak	4	5	6	5
,, fir	2	5	4	0
Memel fir.....	2	5	3	10
Riga	2	17	3	2
Swedish	2	0	2	13
Masts, Queb. red pine	3	10	6	0
,, yellow pine ..	4	5	6	0
Lathwood, Dant. fm.	4	0	6	0
,, St P'burg.	6	0	6	5
Deals, pr C., 12ft by 3 by 9 in. duty 2s. per load, drawback 2s.				
Quebec, white spruce	12	0	17	10
St. John, white spruce	12	0	15	0
Yellow pine, per reduced C.				
Canada, 1st quality..	18	0	19	0
2nd do.....	12	0	13	0
Archangel, yellow ..	10	10	12	10

	£	s.	£	s.
St. Petersburg, yel..	11	0	12	0
Finland	6	10	8	0
Memel	7	0	9	0
Gothenburg, yellow	7	10	9	15
,, white ..	0	0	0	0
Gefle, yellow	9	0	10	10
Soderham	8	0	9	10
Christiania, per C., 12 ft. by 3 by 9 in. yellow	10	0	12	10
Flooring Boards, per sq. of 1in., first yel.	7	6	10	6
First white.....	7	0	9	6
Second qualities	6	0	7	0
Pumice Stone pr tn	6	0	8	0
Oils, &c.				
Seal, pale .. per tun	43	0	0	0
Sperm body.....	91	0	0	0
Cod.....	38	10	0	0
Whale, Sth Sea, pale	39	0	0	0
Olive, Gallipoli.....	58	0	59	0
Cocoanut, Cochin, tun	46	0	0	0
Palm, fine	40	10	0	0
Linseed.....	32	0	32	5
Rapeseed, Eng. pale..	44	10	0	0
Cottonseed	31	0	37	0

Metals.

Lead:—

Pig, Foreign .....per ton	18	7	6	0	0	0
,, English, W.B. ..... do.	19	10	0	0	0	0
,, Lead Co. ..... do.	19	5	0	0	0	0
,, Other brands ..... do.	18	15	0	19	0	0
Sheet Milled ..... do.	19	5	0	19	10	0
Shot, Patent ..... do.	22	0	0	0	0	0
Red or minium ..... do.	20	10	0	0	0	0
Litharge, WB ..... do.	0	0	0	0	0	0
White dry ..... do.	26	0	0	28	0	0
,, ground in oil ..... do.	26	0	0	29	0	0

Copper:—

British—cake and ingot .....per ton	70	0	0	0	0	0
Best Selected..... do.	71	0	0	72	0	0
Sheet ..... do.	76	0	0	78	0	0
Bottoms ..... do.	78	0	0	0	0	0
Australian ..... do.	71	0	0	74	10	0
Spanish Cake ..... cash	0	0	0	0	0	0
Chili Bars ..... ,,	66	5	0	67	10	0
,, refined ingot	69	10	0	71	10	0
Yel. Metal Sheathing & Rods .....per lb.	0	0	6½	0	0	6¾

MEETINGS FOR THE ENSUING WEEK.

Tuesday.—Institution of Civil Engineers. Discussion on Mr. Seaforth's paper "On the Dressings of Lead Ores;" also paper on "Railway Rolling Stock," by Mr. R P. Williams. 8.

Wednesday.—Civil and Mechanical Engineers' Society, "The Pacific Railroad," by Mr. Arthur Tyrrell. 7.30.

,, Geological Society. 8.

Saturday.—Associated Arts Institute. Exhibition of Sketches. Discussion Thesis—"That True Art must be Conventional." 8.15.

Trade News.

WAGES MOVEMENT.

The Nine Hours Movement in the Building Trade.—A meeting of the delegates from the carpenters' and joiners' societies in furtherance of the above movement was held at the Duke of York Tavern, Lambeth, on Saturday evening, Mr. Sinclair in the chair. Several new delegates handed in their credentials. The chairman said he was glad to find the movement was steadily progressing. He pointed out the advantages which would accrue to the trade by the adoption of the nine hours, and thought the present time, when so many of their fellow working men were walking idly about the streets, while others were working systematic overtime, most opportune for effecting a reduction in the hours of labour. The delegates then gave in their reports, which proved the rapid progress of the movement. During the past week district meetings had been held at Brixton, Chelsea, Paddington, Finsbury, Marylebone, and King's-cross, and the new code of working rules has been well received at each meeting. After the transaction of provincial business, and appointing deputations to attend the district meetings to take place during the ensuing week, the proceedings concluded with a vote of thanks to the chairman. The aggregate meeting will be held shortly after Easter, it being the desire of the delegates to bring the movement to a successful close as early as possible, feeling that prolonged agitation would do more h arm than good.

TENDERS.

Bethnal Green.—For addition to infirmary at the Bethnal Green Workhouse, for the guardians of Bethnal-green. Wm. Mundy, architect. Quantities supplied:—

R. Cook	£2763
Lathey, Bros.	2370
A. Borton	2360
Higgs	2247
Nightingale	2223
R. Marr	2156
Hill, Keddell, and Waldram	2150
Blackmore and Morley	2130
Capps and Ritso	2090
Garrud	2074
King and Sons	2029
Wicks, Bangs, and Co.	1990
Brown and Sons	1950

Bognor.—For contract No. 3, Bognor sea defences, Sussex. Mr. Arthur Smith, engineer. Quantities supplied by Mr. G. W. Ranwell, 3, Westminster Chambers:—

Green	£2326
Mills	2310
Vickers and Crane	2263
Bushby	2257
Goble	2234
Hayter	2170
Warren	2169
Quick	2019
Blackmore	1934
Harries (accepted)	1807

City.—For new hall and premises in Noble-street, City, for the Coachmakers' Company. Mr. Fred. Chancellor, architect, Pinner's Hall, Old Broad-street. Quantities supplied by Messrs. Karslake and Mortimer:—

Downs	£1795
Hill and Sons	4697
Turner and Sons	4659
Macey	4439
Brass	4340
Cooper and Cullum	4328
Henshaw	4283
Conder	4268
Coles and Son	4038
Browne and Robinson	3963
Crabb and Vaughan	3512

Chelmsford.—For alterations at Springfield Hall, near Chelmsford, for W. J. Beadel, Esq. Mr. Fred. Chancellor, architect:—

Brown	£1700
Gardner	1680

East Sheen, Surrey.—For villa residence. Mr. E. Ingress Bell, architect. Quantities by Mr. James Gandy:—

Sharpington and Cole	£1800
Adamson and Son (accepted)	1725

Essex.—For new farm buildings at Little Braxted Hall, Essex, for Chas. Ducane, Esq. Mr. Fred. Chancellor, architect:—

Saunders	£1806
Gardner	1790
Brown	1780

Great Waltham.—For new church and parsonage house, Forth-end, Great Waltham, Essex. Mr. Fred Chancellor, architect:—

	Church.	Parsonage.
Brown	£2400	£1518

Henham.—For new farm buildings at Parsonage farm, Henham, Essex, for J. Baxendale, Esq. Mr. Fred. Chancellor, architect:—

Davies and Ratcliff	£1299
Glasscock	1253
Cole	1090

Knutsford.—For eight model cottages of six rooms each, at Knutsford, Cheshire, for the Knutsford Freehold Building Committee. Mr. Sherwin, architect. Quantities supplied:—

	Cottages.	Boundary walls, &c.
Ellis	£863 1 11	£115 16 5
Massey	850 0 0	110 0 0
Whiteman	812 9 4	109 18 6
Cardwell	784 17 6	126 18 8
Burton (accepted)*	760 0 0	112 5 0

* Being £95 per cottage, including fitting grates, &c., and outbuildings. Competition designs were advertised for, the architects' limit being £100 per cottage.

Littleton.—For additional training stables, for H. Goater, Esq., at Littleton, Hants. Mr. A. Bedborough, architect. Quantities by Messrs. Curtiss and Son:—

Grace and Hawkins	£800
Fielder	750
Stevens	683
Sanders, Southampton (accepted)	676

London.—For alterations at 51, S. Martin's lane, W.C., or Messrs. Hayward and Co. Mr. W. F. Potter, architect:—

Stokes and Gill	£429 0
Watson, Brothers	320 0
Perkins	295 0
Hammer	239 10
Honour (accepted)	153 0

London.—For rebuilding Nos. 66, 67, and 68, Margaret-street, and No. 118, Great Tichfield-street. Mr. W. A. Baker, architect. Quantities estimated by Messrs. Richardson and Waghorn:—

Hyde (accepted)	£3220

Marylebone.—For the erection of the "Bedford Arms" Tavern, South-street, Marylebone. Mr. W. A. Baker, architect. Quantities furnished by Messrs. Richardson and Waghorn:—

Mitchell	£2177
Manley and Rogers	1900
Hill, Keddell, and Waldram	1850
Phillips and Son	1849
Brown	1717
Browne and Robinson	1670
Hyde	1669

Preston.—For new class room to the parish church school. Myres, Veevers, and Myres, architects:—

Alston	£190
Heathcote	190
Gillett (accepted)	170

Preston.—For public house and shops, Church-street. Myres, Veevers, and Myres, architects:—

Jackson	£689 0 0
Tomlinson	643 0 0
Walker	640 0 0
Turner	639 0 0
Brown Brothers	630 17 0
Huntington	626 0 0
Hull	618 14 0
Haine Brothers	616 18 0
Clayton	614 10 6
Cowell and Clayton (accepted)	604 0 0

Red Hill, Surrey.—For a villa at Red Hill, for F. Campion, Esq. Mr. J. Lees, architect:—

Cook	£1521
Nightingale	1480
Hooper	1337
Baguley (accepted)	1375

South Hackney.—For Christ Church. Mr. W. Wigginton, architect:—

Hill and Co.	£5538
Howard	5488
Killby	5431
Enuor	5110
Dove, Bros.	4945
Axford and Whillier	4875

Sutton.—For the erection of three houses, workshop, and gateway for Mrs. Hoare, in West-street, Sutton, Surrey. Mr. Sparrow Harrison, architect. Quantities supplied:—

Martin	£957
Keal	897
Maeers (accepted)	859

Terling.—For house and buildings, Ringers Farm, Terling, Essex, for the Right Hon. Lord Rayleigh. Mr. Fred Chancellor, architect:—

	House.	Buildings.
Gardner	——	£935
Saunders	£925	885
Brown	880	860

Terling.—For new dairy, Terling, Essex, for the Right Hon. Lord Rayleigh. Mr. Fred. Chancellor, architect:—

Saunders	£460
Brown	440

COMPETITION.

Bradford Abattoir Company, Limited.—Extension of time to 2nd May.—Plans, &c., of a slaughter-house, cattle sheds, and all necessary appurtenances to a slaughter-house proposed to be built at Bolton Bridge; also plans for an hotel and outbuildings, adjoining to Bolton-road, and near to the proposed slaughter-house. The directors will give £20 for the best, and £10 for the second best set of plans. Messrs. Dixon and Hindle, Land Agents, &c., Kirkgate, Bradford.

Manchester, May 30.—For abattoirs and a carcase market. The following premiums will be awarded:—One of £150, one of £100, and one of £75. Joseph Heron, Town Clerk, Town Hall, Manchester.

CONTRACTS OPEN FOR BUILDING ESTIMATES.

Worle Church, Somerset, April 11.—For the general restoration and re-seating of the parish church of Worle, near Weston-Super-Mare. John Norton, Esq., Architect, 24, Old Bond-street, London, W.

Fawsley, April 11.—For the erection of farm buildings, on the Fawsley Estate, Northamptonshire. Mr. Waters, Estate Office, Fawsley, near Daventry.

Macclesfield, April 11.—Cheshire New County Asylum.—For the erection of gas works, steam engine, and other engineering works. Robert Griffiths, architect, Martin-street, Stafford.

Sittingbourne Waterworks, April 18.—Contract No. 1.—For erecting an engine and boiler house and other works at Keycoll-hill, near Sittingbourne. Contract No. 2.—The supply and erection of a steam engine, boiler, feed pumps, and gear. Contract No. 3.—To supply and fix a set of three-throw pumps, on the vertical principle. W. J. Harris, Clerk to the said Committee, Sittingbourne.

Parish of S. Pancras.—Leavesden Woodside Schools, April 11.—Contract No. 3.—For supplying and erecting duplicate engines, boilers, and pumps for lifting water from a well about 180ft. deep into a tank about 75ft. high, and for other works. Contract No. 4.—For supplying and erecting a cast-iron water tank on a tower about 75ft. high, with all necessary pipes, valves, and other fittings. Daniel Fildew, clerk. Clerk's offices, Vestry Hall, S. Pancras, N.W.

Cambridge, May 6.—For the erection of a corn exchange, in Wheeler-street and Corn Exchange-street. Edmond Foster, town clerk, Cambridge.

Lewisham District, April 13.—For the sewerage, jobbing works, and iron works, road scrapings, collection of dust and rubbish, and horse hire. Samuel Edwards, clerk to the board, Grove-place, Lewisham, S E.

Snaresbrook, April 13.—For the erection of an additional wing and infirmary to the Seamen's Orphan Asylum at Snaresbrook. R. W. Hackwood, Secretary.

Barrow-in-Furness, April 18.—For the erection and completion of a steam corn mill. William Thomas Manclarke, secretary, Barrow-in-Furness.

London, April 14.—Committee of the Seamen's Hospital.—For the erection of an iron railing, on a Portland stone curb, with brick foundation on two sides of the ground of the Infirmary of Greenwich Hospital. Kemball Cook, secretary, 86, King William-street, E.C.

Kingston-upon-Hull Local Board of Health, April 21.—For the construction of about 2500 yards in length of brick sewers, and other works. C. S. Todd, clerk to the board, Hull.

Evesham, May 2.—For the restoration of S. Mary's Church, Chelmswickham. Rev. J. Hartley, Chelmswickham, near Broadway.

Halifax, April 30.—For the erection of a Unitarian chapel. William Bakewell, architect, 12, East-parade, Leeds.

Stourbridge, April 14.—For the erection of a corn warehouse, stables, &c., for Wm. C. Firmstone, Esq. Thomas Smith, architect, the Mount, Stourbridge.

BATH STONE OF BEST QUALITY.

Randell, Saunders, and Company, Limited, Quarrymen and Stone Merchants, Bath. List of Prices at the Quarries and Depôts; also Cost for Transit to any part of the United Kingdom, furnished on application to

BATH STONE OFFICE,
[Advt.] Corsham, Wilts.

PARTNERS HIPS DISSOLVED,

Metcalfe and Co., Chowbent, engineers—Paterson and Co. Birmingham, engineers—Owen and Martin, Bishopsgate-street-without, brassfounders and gasfitters—J. and J. Heiffor, Manchester, builders—Parker and Holdsworth, Calverley, Yorkshire, joiners—Booth and Griffiths, Kingsland-road, stonemasons—Dowson and Co., Princes-wharf, Commercial-road, Lambeth, timber merchants—Bayley and West, Coventry, painters and glaziers—Gillibrand and Harrison, Blackburn, joiners.

Building Land to Let.—

AT ROEHAMPTON, SURREY, for detached and semi-detached Villas; also a few sites for shops on Earl Spencer's Estate.

AT MILVERTON, NEAR LEAMINGTON, for detached Villa residences on Earl Warwick's Estate.

AT ASHFORD, NEAR WINDSOR, adjoining the station, for Villa residences on General Brownrigg's Estate.

AT WEST HAM, ESSEX, close to the Stratford and Stratford Bridge stations of the G. E. Railway, suitable for small property; also some very advantageous frontages with wharfage, suitable for manufacturing premises, on the Rev. H. R. Rokeby's Estate.

FOR SALE, about 12 acres of Building Land adjoining Wandsworth Common.

Apply to Messrs. Beeston, Son, and Brereton, Architects and Surveyors, 27, Grosvenor Mansions, Victoria-street, Westminster.

To Builders and others.—Land for the ERECTION of houses, shops and hotel, adjoining Sudbury-station, on the London and North Western Railway. TO BE SOLD or let on lease for 99 years. Advances made to respectable builders.—Apply to view the estate to Mr. Watchorn, near the station, or Mr. S. Hickson, 9, King's-road, Bedford-row, W.C.

Crystal Palace Company.—To Builders and others.—Crystal Palace Estate.—The Crystal Palace Company are prepared to let on building leases for a term of 99 years, certain portions of their freehold property abutting upon the Peace-road, Thicket-road, Anerley-road, and Palace-road. Plans and conditions may be seen on application to John Norton, Esq., Architect, 24, Old Bond-street, W., or to Mr. Hart, Accountant, Crystal Palace, Sydenham, S.E

City of London.—To be Sold or Let, on building lease, an important FREEHOLD PROPERTY, comprising a superficial area of over 7000ft., with good frontage to a leading thoroughfare, three minutes' walk from the Bank of England. The ground is suitable for the erection of a large office, building warehouse, wholesale and retail business premises, and for any purpose requiring space and publicity within the great centre of commerce. Plan and particulars may be obtained of Messrs. St. Quintin and Notley, Surveyors, 27, Royal Exchange.

Barlow Rails.—Wanted sufficient second-hand Barlow Rails (of light section and in good condition), to lay down 200 yards of tramway.—Send price and section to Pictor and Sons, Box, Wilts.

Important to Builders and Others.—A large quantity of PAPIER MACHE CENTRE FLOWERS to be SOLD, a bargain, the manufacture being relinquished.—Apply to Wm. Dyer and Co., Woolwich-road, near Greenwich Union.

Joiner's Bench.—To be Sold, cheap, in consequence of the space being required, a Sawing, Grooving, Rabetting, and Tenoning Bench fitted with 30in. Rip Saw and Drunken Saw, price £20 only.—Sweetser and Wadman, Wood Machinists, 9, Essex-road, Islington (near Agricultural Hall)

Pure Water.—The latest patented Cistern Filter in general use is the SELF-CLEANING CHARCOAL CISTERN FILTER, a great improvement; filed in July last by FREDERICK LIPSCOMBE and CO., Temple Bar, who are fixing more filters into cisterns than all other filter makers put together. Prospectus free.

Mr. H. C. Bunkell has applications for all kinds of Securities and Investments. Notices of Estates, Land or Houses to be Let or Sold are inserted in his monthly register, and extensively circulated free of charge. Commission only upon business completed. Fixed and moderate. Applications and particulars requested to be forwarded to his Auction, Land and Estate Offices, 30, King-street, Cheapside, E.C.

John Gosnell and Co.'s Cherry TOOTH PASTE is greatly superior to any tooth powder, gives the teeth a pearl-like whiteness, protects the enamel from decay, and imparts a pleasant fragrance to the breath.
Angel-passage, 93, Upper Thames-street, London.

Attractive Novelties.—Professor Pepper's Lecture Entertainment, "On the last New and Wonderful Ghost Effects, and other Optical Resources of the Polytechnic." The Romantic Tale of RIP VAN WINKLE, with Extraordinary Dioramic and Spectral Scenes. The story narrated by Mr. Ward — Vocalist, Miss Poyser; and the new Music by Mr. Proven. Herr Stubenrauch, and Band.—American Organ daily.—Professor Pepper's Annual Course "On Astronomy and Spectrum Analysis" Wednesdays at 2.30 and Saturdays at 3, during Lent, at the ROYAL POLYTECHNIC. Open from 12 to 5 and 7 till 10. Admission to the whole 1s.

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THE BUILDING NEWS.

LONDON, FRIDAY, APRIL 15, 1870.

THE DRAINAGE OF PRESCOT.

TOWARDS the latter end of last year the Local Board of Health at Prescot, Lancashire, invited engineers to send in plans, in competition for the prize of £100, for the best method of draining the town and disposing of the sewage, in answer to which they received sixteen plans and reports, one of which, marked "Sufficient," we will briefly describe.

Prescot is situated on a hill, at the foot of which runs a foul brook, which receives the refuse of tanyards and other offensive matter unconnected at all with the sewage of Prescot. On one side of the town lies land suitable for irrigation by gravitation direct from the town.

These being briefly the circumstances, the author proposes to leave the existing surface drains to carry off the rainwater to the ordinary watercourses, and to lay down a new pipe sewer in every street to receive the sewage, and carry it all to one point near to the brook first mentioned, and there to construct a tank in two divisions, into each of which alternately the sewage is to be received. As to irrigation, the author advises that if the land pointed out as suitable can be had on reasonable terms by agreement, it should be irrigated in the ordinary way, the inclination of the main sewer being for this purpose reversed in the direction of the land, but he does not recommend the Board to purchase this or any other land for the purpose of irrigation compulsorily in the existing state of the law in that respect provided. Presuming that the land would not be had except under these latter circumstances, the author proceeds to describe the construction and working of the tanks. By this method he makes no pretension to render the sewage water absolutely pure, but only to keep from flowing into the brook the solid part of the sewage, and to convert it into manure by mixing with it the street sweepings and other town refuse. Owing to the great inclination of all the sewers, the sewage would arrive at the tanks in a fresh state, and would be on that account of more than ordinary value as manure. Sewage entering a drain at the most remote part of the town from the outfall would arrive there in one hour, while the average of the whole town would be 30 minutes. The collection of the solid parts of the sewage in this way is not to be mistaken for the method that is sometimes adopted of letting the sewage matter accumulate for weeks together and then digging it out on the large scale, or with the method of treating the sewage with lime. These methods destroy the value of the solid sewage as a manure. The plan here proposed is simply to receive the sewage from the town in settling tanks, from which the water would be drawn off through strainers into the brook. If at any future time a combination of the interests in the brook throughout its course should render it desirable to purify this water chemically before its discharge, the Board are advised that they may adopt one of several methods of purifying sewage water that have been lately adopted with apparent success, and this by merely adding to the tank proposed others that would in that case be required. But looking at the present state of the brook, the course it runs, and its outfall into the river Mersey, at Runcorn, any such combination is not probable.

Having stated that the old drains are to be left to carry off the rainwater, and the new sewers the sewage from the houses, and their appurtenances, the author comes to an important part of the whole question, viz., scavenging. At present, the bye-streets, courts, and alleys are not scavenged, and as it is intended in this plan to leave the present drains to carry off the surface water, it is deemed to be essential that all these places shall be efficiently swept, and the refuse carted away. When that is done, the author believes that the increased cleanliness to the eye alone will be worth all the cost, and remarks that, having been largely employed in town improvements of all kinds, nothing in his experience has had a more direct and practical effect in these respects than efficient scavenging. The sweepings, together with the other refuse, would be taken to the outfall tank, and there mixed with the solid sewage matter.

As the bulk of the rainfall is to be excluded from the sewers, flushing becomes necessary occasionally; and this it is proposed should be done by self-acting flushing boxes fixed at the heads of sewers in courts and alleys. These boxes are so made that when empty they stand on a frame. The pivots upon which they turn are centred behind the true centre of the box; so that, when full, the fore end becomes heavier than the hinder end, and tips over. In consequence of the peculiar shape of the discharge pipe, a syphon is brought into action as soon as the throat of the pipe becomes gorged with water, which it does as soon as the box begins to tilt over, by which means the contents are emptied at once in a flush, after which, the box returns to its normal position. It is proposed to supply these flushing boxes with rainwater from the roofs of adjacent buildings, so that every shower of rain will fill them once or oftener, according to the time of its continuance. There being in general plenty of rain in Prescot, the flushing from this source would probably be found quite sufficient for all purposes. The quantity thus admitted to the sewers can be, of course, limited at pleasure.

The settling tank is to be divided into two equal compartments. The rate of flow of sewage is not equable day and night. One half of it usually flows off in eight hours of the day, while the night flow is comparatively small. One of the divisions, which call No. 1, will receive the flow of the sewage from 10 o'clock a.m. to 6 o'clock p.m., which will be in quantity one half of the whole 24 hours' flow. At 6 p.m. the sewage will be shut off from No. 1, and turned into No. 2 division, into which it will continue to flow until 10 o'clock next morning.

The sewage in the division No. 1, that had been shut off at 6 p.m. the previous day, will settle during the night; and at 6 o'clock in the morning the discharging sluice will be opened and the water run off through the strainers down to a level 7ft. below the top water level of the tanks. This discharge will occupy three hours. At 9 o'clock the deposited matter in No. 1 division will be raised to the surface by means of a chain pump (the tanks are to be arched over and covered with a thickness of 2ft. of earth, and the space made use of upon which to mix the street sweepings with the sewage) from the sump hole provided for its reception in the centre of each division. By 10 o'clock this division will be again ready to receive the sewage, which will then be shut off from No. 2 division and turned into No. 1, as on the previous day. The sewage that had been running into No. 2 division during the night will then be allowed to settle until 2 p.m., when the discharging sluice of that division will be opened and the water run off into the brook during the next three hours, or until 5 p.m., when the deposit will be raised to the surface and the division made ready to receive sewage again at 6 p.m., when division No. 1 will be shut off again as before.

Two men will be sufficient for all the work to be done: that is, turning the sewage into and out of the tank as required, raising the deposit, mixing it with the street sweepings and other refuse from the town, and loading the carts with the manure.

An overflow culvert is provided to carry the sewage round the tanks direct into the brook, if ever it may be desired to cut it off from the tanks for temporary purposes.

Following the items of the printed instructions, the ventilation of the sewers is next considered, and under this head the author remarks that every inlet to a drain at the ground level ought to be trapped (but not by a "bell trap," which is a form of trap that ought never to be used), and when these inlets to the drains are trapped a ready means of escape for the sewage gases ought to be provided, and they should be conducted into the atmosphere above the roofs of the houses, so that on their escape they are destroyed by dilution with the atmosphere at a point beyond the reach of air breathing. These ventilating pipes should be mostly at the upper ends of the sewers and drains, where the gases have a natural tendency to accumulate. The gable ends of houses are preferred, but the pipes may be taken up to a point above the roof anywhere except in close proximity to bedroom windows.

The sewers are to be of 9in. and 12in. glazed earthenware socket pipes, jointed with well-tempered clay, and the outfall sewers of brickwork in mortar, 18in. diameter. The least inclination of any sewer is 1 in 480, its carrying capacity when running half full being 50 cubic feet per minute, while the calculated maximum quantity of sewage that will enter it is 30 cubic feet per minute.

The instructions required observations to be made on the best form of water-closet, and it is here said that the best form for houses where expense is not a consideration is contained not in the house itself, but in a detached building approached from within the house by a passage with double doors, and so constructed that a thorough draught passes through at all times; the closet pan to be supplied with water from a cistern overhead with a discharge pipe of not less than 1½in. diameter; the common fault of waterclosets being the too small size of this pipe, permitting the descent from the cistern of a dribble of water merely, instead of a flush, whereby the valve is required to be kept open for too long a time; for during the time that the valve is kept open foul air is coming up into the closet; whereas with a down pipe of sufficient size, and a ventilating pipe carried up from the soil pipe immediately below the pan and passed through the wall into the external air, a flush of water is at once obtained and the foul air is driven outwards. But coming to water-closets for courts and alleys, and for cottage property generally, the author has found a simple pan and trap, without a supply of water being laid on to the closets, sufficient, and indeed preferable to any machinery or arrangement of valves and chains, which often suffer wilful damage and soon get out of order; that is when a proper supply of water is laid on to the house, so as not to entail too much labour or trouble in fetching it. In these cases most tenants will take the small trouble of throwing down a pailful or two of water daily for their own convenience, if for nothing else.

As to what is best to be done with the present privies and ashpits until these water-closets can be adopted, the author says they should be covered so as to protect the contents from the rays of the sun and the flow of rainwater into them, and that the scavengers should be instructed to throw into each of them once a week a quantity of chloride of lime, spreading it about the sides as well as the bottom.

The sewers are to be laid at an average depth of 9ft., that being the depth required to drain the cellars of the houses, which are numerous at Prescot, and many of which are in a bad condition.

Candidates were invited to turn their attention to the question of water supply, and to

state whether, in their opinion, an independent supply would be advisable instead of continuing to take water from the reservoir of the Liverpool Corporation situated at Prescot, but at such a level as to be capable of supplying only the lower parts and middle zone of the town, while the higher parts are wholly unsupplied. But the author of this plan dismisses the question of an independent supply as being impracticable, and states that the supply ought still to be continued from the Liverpool works, but that the Prescot Board ought to require their supply of water to be of equal purity to that enjoyed by Liverpool, which is not now the case. There are two large service reservoirs at Prescot belonging to the Liverpool works, which receive water from Rivington Pike, and between the two reservoirs are filter beds and a pure water basin, from which the supply to Liverpool is derived, but the Prescot supply is derived directly from one of the large reservoirs, and what the author recommends is that the pipe supplying Prescot should be extended across the bottom of the reservoir into the pure water basin. And, further, that the Liverpool Corporation should be called upon to pump over a stand-pipe to be erected at the site of the reservoirs a supply of water for the higher parts of the town. As this supply would form but a small part of the whole the expense would not be great, while the convenience to the residents would be very great, and considering that any person or body undertaking to supply a town with water cannot be said to perform their whole duty thereto so long as any part of the town is left unsupplied, the author is of opinion that, in all fairness, the expenses of these improvements ought to be borne by the Corporation of Liverpool.

ON THE DESIRABILITY OF RESTORING THE ITALIAN CHURCHES OF LONDON.

THE paper lately read before the Institute by the Rev. E. L. Cutts deals with a subject of such importance that something more may well be said upon it while still fresh in the minds of those interested in church architecture. Restoration seems to be the term somewhat loosely applied to all material alterations in our churches; otherwise, we might object that the word by no means expresses the vast change from their original state some of these buildings have undergone. During the last few years several churches in London have been, in this sense of the word, restored, and the present object is to express a few thoughts with regard to the way in which this so-called restoration has been carried out.

In the first place must be considered the internal arrangements of the churches with reference to public worship. It would be out of place here to speak of the changes in form that the services of the Church of England have undergone during the last two centuries. We need only look to facts as they at present exist. The want of distinctly marked chancels, with space for the altar and seats for the clergy and singers, the ponderous galleries, the mighty piling up of pulpit, desk, and clerk's box, together with the old-fashioned pews, have called forth a passion for destruction, akin to that which doomed so much that was glorious in art during the sixteenth century.

The last forty years has seen a great change in our views on the most fitting form for worship. Religion and ecclesiology have acted mutually on each other, and the tendency now is to return to an earlier period of church history for the modern ritual. If a gaily-draped altar, a reredos with mosaics or inlaid marbles, the pulpits, desks, and organ placed according to certain canons, and the space for the congregation occupied by open seats or even chairs, be found best to aid our devotions, all claims of antiquity must give way before these higher considerations. We must not call this "Gothicising" the churches, but the work must be undertaken with a good heart, free from all fancied trammels laid upon us by the accidents of style. But let us narrowly watch that these changes are made as the result of downright conviction, and not from the thirst for following the caprices of fashion. The fittings of these churches are often examples of carved oakwork of the most exquisite beauty, and the monstrous "three-decker" pulpits are often adorned with decorations in wood of great richness.

One case may be quoted—the Church of S. Olave's, Hart-street, is threatened with the immediate destruction of its old pews. This is one of the few city churches that escaped the great fire, and it is an interesting building of late Gothic date, containing some fine Jacobean monuments to civic worthies, and a tablet in memory of the wife of Samuel Pepys, who himself is buried below. The pews are of the type common in City churches; the sides and doors are handsome, but according to our present notions, rather high; and, in most cases, it must be confessed, the seats are carried round three sides. But their most noticeable features are the carved panels along the tops of the principal pews. Here the lover of art will find a rich display of work of the school of Grinling Gibbons. The removal of this woodwork from the church would be a great loss; its destruction we will not contemplate. In no art collection could it have the interest it possesses here, in its native element, and no argument that the fittings of a church should be in keeping with the general architecture can hold good where the doomed work can claim so respectable an age, and where it has such great intrinsic worth. Let us hope that some such considerations as these have been duly weighed, and that, if the church must be reseated, the new fittings will show little else than a fresh adaptation of the old materials.

How best to decorate the windows of these churches is another most important point. The interior of S. Michael's, Cornhill, a church generally attributed to Wren, has lately been transformed by Mr. Scott and Mr. Williams. The result is in many respects satisfactory; but this question suggests itself—Was it wise to put tracery into the windows of the aisle and clerestory? This particular church, however, offered unusual temptations. Before the alterations, the aisle had not, as might be supposed, simple round-headed openings; but having marked out upon his wall windows of this form, Wren turned inverted arches under the first, carried the archivolts round them, and so had circular windows placed at the head of square blanks. This form may be seen at S. Magnus, by London Bridge, and if not beautiful, it is yet quaint and characteristic. If the object in enlarging these windows was to gain light, why was such fully-coloured glass used, and why were the heavy mullions thrust in?

The name of Wren is a mighty bulwark in the history of architecture. Wren was a great historical personage, and his reputation, as embodied in his works, must be kept clear from the mists that successive generations so often cast upon the remains of bygone ages. Let us not plead the authority of the builders of the fifteenth century, who filled the spacious windows of their Norman forerunners with Perpendicular tracery, as a means, perhaps, of providing a better field for their painted glass. But we must turn to S. Lawrence Jewry, the church by the Guildhall, and see how this same difficulty has been managed by Mr. Blomfield. Here the two round-headed windows at the east end, and one on the south side, have been filled with painted glass by Messrs. Clayton and Bell, and two large circles near the altar by Messrs. Heaton, Butler, and Bayne. These windows are left in their simple expanse as designed by Wren. Round the outlines of the former, to which special praise is due, is carried a bold margin, set with small medallions, and the whole height of the windows is divided into two compartments containing figure subjects. The treatment of the work here is quite different from the Gothic work at S. Michael's, and the effect is far more beautiful than that of the Munich windows in S. Paul's, with their yellow architecture and blue back grounds. A similar subdivision of lights has been carried out at S. Swithin's, Cannon-street, and S. Mary's, Aldermanbury, and in each case it is to be regretted; not that the nakedness of the fenestration is not felt to be one of the strongest cases against the revived Classic as compared with the Mediæval styles, but because it is an uncalled-for perversion of the original design. One eminent architect has proposed filling in these windows with wooden tracery, and it is a valuable suggestion. For if the material be made to declare itself, it cannot seem to enter so closely into the constitution of the window as stone mullions and arches, but would appear to belong to the glazing rather than to the wall. The same arguments, therefore, can hardly be brought against its use. But the church of S. Lawrence shows a bold manner of grappling with the difficulty, and the success attained is richly deserved.

On the decoration of these churches much might be said. Something has already been done, and if sufficient interest be bestowed upon them, and funds be forthcoming, much may yet be accomplished. We should like to learn what were the views of Wren on coloured decoration as applied to his own churches. The facts of the case, however, might be hard to learn, and, if attained, might prove unsatisfactory. His knowledge of the different schools of glass painting, of mosaics, and of colour in general, was probably not great. Mr. Penrose, in an appendix to Dean Milman's "Annals of S. Paul's," tells us that Wren's general views with regard to the completion of the interior of S. Paul's have been recorded, but that little is known in detail of the manner in which he would have carried them out. Mosaics, painted windows, and inlaid marbles form the leading features of the decoration of the Cathedral now in progress, and lovers of art must wish the scheme all success. If we think that our acquaintance with art history is wider than Wren's, and our judgment truer, we ought surely to call our modern skill into play in these very buildings, considering that we are adding to the original design, but in no sense altering it, as actually carried out.

The future of these City churches it is hard to foresee. Often well nigh deserted by their congregations, and covering sites of immense value, arguments may well be brought against their maintenance. Several have already disappeared, and coming years in all likelihood will see the destruction of many more. Cockerell and Clayton have preserved for us their forms, but their removal will still be a loss. Who does not recognise in these churches, whether they meet us in the busy thoroughfares, or stand in their quiet graveyards among the winding lanes of the City, one source of that interest and quaint picturesqueness of which the older parts of London have still so large a share? But it is not from the streets themselves that the artistic value of these churches is most keenly felt. From the river, the bridges, or some high station point, their varied towers and spires, rising almost from the water's edge, leading up and giving scale to the crowning sublimity of the dome of S. Paul's, must be acknowledged to be one of the chief architectural glories of which London can boast.

Under the head of Italian Churches must be ranked a large number of buildings of the very humblest description, erected for the most part in the last century, and during the early years of our own. On most of these but little skill or cost seems to have been expended, to make them fulfil

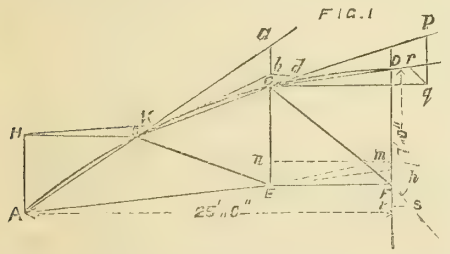
any further end than the barest necessities of places of worship. They may be accounted beyond the pale of artistic criticism, as examples of *building*, not of *architecture*: and the work before us is to engraft some architectural character upon these sorry stocks. In such cases we may deal with a far freer hand. Sometimes it may be well to keep to the general ideas of the original designer—at others, the adapter may work with tolerable independence. In using any means at their command to bring such churches into harmony with the religious and artistic feelings of the present day, there is ample field for the energies of our ecclesiologists. But in handling buildings of an earlier date, and with architectural character to recommend them, we must be guided by a spirit of strict conservatism. It will not be well if coming ages fix upon this archæological generation the stigma of having wantonly tampered with the works belonging to an important phase of our architectural history that has long since passed away.

A. H. P.

ARCHED ROOFS.—No. III.

VIEWED in an æsthetical light, the open roof of trussed ironwork in the arch form is one which may claim precedence over the more massive and ponderous examples. There is an elegance and lightness about the framework which contrasts favourably with the heavier specimens of the plate type. They are especially well adapted for roofs of large span, not only on account of the reasons already mentioned in our previous article, but because the strains upon the bracing are comparatively small, and therefore the full value of the trussed arch is not obtained in examples of limited span. In fact, the trussed arch is the form for large roofs for precisely the same cause that the bowstring bridge is the proper type to select for large bridges with a heavy moving load. The example selected of a trussed arch roof in fig. 1 has a span of 50ft.,

FIG. 1



a depth of truss of 7ft., and is supposed to be loaded with two tons on the whole roof, or one ton on the half principal shown in the figure. The thick lines represent the parts in compression, and the thin ones those in tension, from which it is at once evident that the whole of the upper flange or bow is in compression, and the lower or tie in tension. Also B E C F are struts, and C E, D F ties. When the design of a trussed roof is of a very complicated nature, it is not easy to determine, as in the present case, by mere inspection those parts which are in compression and those which are in tension. It is not until some progress has been made in the analysis of the strains that the manner in which they affect the various members of the truss becomes apparent. Having ascertained those bars which are struts and those which are ties, the next point is to examine into the distribution of the load. Referring to fig. 1, we have a total load of one ton upon the half principal, and it is divided as follows:—There will be one-third situated at each of the points B and C and one-sixth at A and D. Thus, we shall have at B and C a weight of 0·33 tons, and at A and D a weight of 0·165 tons. It will, however, be apparent by a glance at the diagram that the weight of 0·165 tons at A is supported directly by the vertical reaction of the abutment, and consequently produces no strain whatever on any part of the truss. Its action may be therefore ignored, and the total weight on the principal producing strain on its various parts will be equal to 0·825 tons instead of one ton. This theoretical assumption will not hold unless the distance A B or unsupported length of the rafter between the abutment and the strut B E be of sufficiently limited dimensions so as not to allow of any bending taking place. This is always practically effected by subdividing the roof by the introduction of the sloping struts, into lengths which are too small to permit any appreciable deflection.

The relative positions of the subdivisions of the load being adjusted, the next operation is to ascertain the strains upon the various bars, and in the analysis, as in all other calculations, we must always proceed from the known to the unknown. At the point of support A the vertical reaction producing strain upon the roof is the sum of the weight at B, C, and D, since they must all be ultimately transferred to that point. This reaction is therefore equal to 0·825 tons. We have, therefore, three forces at the point A, making equilibrium at the point A, namely, the vertical reaction of 0·825 tons, the strain along A B, and the strain in A E. It must be kept in mind that although in practice the arch is a segment of a circle, it is supposed in the diagram to consist of the polygonally-shaped figure A B C D, the length A B, B C, and C D being straight lines. Each of these is, in fact, regarded as a separate bar, or part of the upper flange. On a scale of one ton to the inch, make A H equal to 0·825 tons; join A B, and produce the line to any convenient length. From the point H, draw H K parallel to A E, meeting A B produced in K. Measuring by the same scale, A K will give the strain upon A B, and H K that upon A E, respectively equal to 1·90 and 1·57 tons. It should be observed here, that were A B in the same straight line with B C, as occurs in the ordinary inclined rafter, then the strain upon A B would be the same as that upon B C, plus the additional strain due to the weight at B. But as in the diagram the direction of the different bars of the arch is continually changing, the question is considerably more complicated. To find the strain upon B C, we must find the resultant of the strain upon A B and the weight at B. Upon A B produced, lay off B a = A K equal to 1·90 the strain already found for A B; draw $a\ b$ vertically equal to the weight at B equal to 0·33 tons; join B b, which is the resultant required. From the point B, draw $b\ d$ parallel to B E, and B d will give the strain upon B C, and $b\ d$ that upon the strut B E. There now remains only the central bar C D of the upper flange upon which to ascertain the strain. This, allowing for the change of direction, will evidently be less than that upon B C, by the action of the weight at C, plus the pull on the queen rod C E. Before the strain upon C D can be determined, that upon C E must first be obtained. This obviously proceeds from the pull at the point E, for since C E is a tie it cannot be affected by the weight at the apex C, which is supported directly by the arch and the strut C F. At the point E there are two forces acting, a compression along B E, and a tension along A E, and the resultant of these will pull upon both C E and E F. The amount of these pulls or tensile strains may be thus ascertained. Produce A E to any convenient length, make E h equal to H K, equal to the strain upon A E; from h draw $h\ m$ parallel to B E. The resultant of the strains in A E and B E will be represented by E m. From m draw $m\ n$ parallel to E F, and $m\ n$ will be the strain upon E F, and E n, the pull upon the queen rod C E. The compression upon C D can now be calculated. Produce B C, and upon it lay off C p = B d; from p draw $p\ q$, equal to the weight 0·33, at C plus the pull E m; from q draw $q\ r$ parallel to C F, and the strain upon C D is measured by C r, and that upon C F by $q\ r$. The question of what becomes of the weight D at the central apex will probably be now demanded. As D F is a tie, the whole of the weight D is conveyed in equal subdivisions to each of the two abutments, and it has already been accounted for, since it was included in the value of A H, which was made equal to the vertical reaction at A. There is yet one more strain to be determined, and that is the pull on the king rod D F. The rod D F can only be affected by the strain upon the strut C F, since it is at right angles to the tie E F. But the corresponding strut upon the other half of the girder will bring a similar strain upon D F; so that if we produce C F, and make F S equal to twice $q\ r$, then drawing S t parallel to E F, the total strain upon D F will equal F t. The strain upon D F is in fact the vertical resultant of the strains in C F, and the corresponding strut upon the other half of the roof.

The strains having been determined they should be tabulated as shown in the annexed table, and preserved for future reference. Before, however, considering the analysis as thoroughly trustworthy, a few of the strains should be checked by some independent method, as errors will frequently occur in estimating them by means of a diagram which are only perceived by employing another process of analysis. The strain upon E F may be checked by drawing from H the line H B parallel to E F. The line H B will equal $n\ m$, the strain already found.

TABLE.

Bars	Strains	
A B	+ 1·90	Arch
B C	+ 1·90	Arch
C D	+ 1·65	Arch
A E	— 1·58	Tie rod
E F	— 1·33	Tie rod
B E	+ 0·25	Struts
C F	+ 0·22	Struts
C E	— 0·22	Ties
D F	— 0·22	Ties

There is this general principle to be borne in mind in determining all strains upon trussed constructions by diagram. Whatever may be the amount arrived at by summation, if the same value for the strain is also obtained by an independent operation it is scarcely within the limits of possibility that it should be otherwise than correct. As an example of our meaning, take the strain found on the end of the bow A B. It is determined at once by the plotting upon the vertical line A H the reaction of the total load upon the half roof. But if each weight were treated seriatim, the sum of the separate strains would be found to equal that obtained in the diagram. It will be of great advantage to those who are unacquainted with the method of analysing strains by geometrical diagrams to work this out for themselves on a good large scale, and tabulate the several strains arising from each weight. The strain on the central bar of the arch C D may be checked by calculation. Let S equal the strain, L the half span, G the distance of the centre of gravity of the half load from the centre of the girder, D the depth of the truss, and W the total load upon the whole roof. Then we have $S = \frac{W\ (L - G)}{2 \times D}$. Substituting in this equation the values for the letters, we get $S = \frac{2\ (25 - 12{\cdot}95)}{2 \times 7}$ solving the equation S = 1·72 tons, which differs only by 0·07 from that arrived at from the diagram, a quantity that may be regarded as inappreciable. In conclusion, it should be mentioned that wherever a trussed principal is employed, in which a sloping rafter is used instead of an arch, the method given in the present case is not applicable. It is not difficult, however, to apply another method which gives equally true results.

The Poultry Chapel is to be sold, it is said, for £70,000, and a new place of worship of great magnitude will be erected for Dr. Parker on the site of Claremont Chapel, Pentonville, within two minutes' walk of the Angel.

Furniture & Decoration.

THE THEORY AND PRACTICE OF MODERN HOUSE DECORATION.

By an Experienced Workman.

BRUSHES AND BRISTLES.

THE selection of good brushes is of the utmost importance to the house-painter and decorator, but is also a matter of some difficulty, which arises from his inability to discover the quality of the brushes until he gets them into actual use—excepting, of course, those who have had a large experience in the buying of this class of brushes; but, as a rule, brushes are purchased on faith of the reputations of well-known manufacturers, or are taken on the representations only of the vendor, who tempts with a low price while vouching for the superior quality of his goods. The bristles of which the best painting-brushes are made are imported from Russia; there is, however, such a great variety of sorts, lengths, colours, &c., that it is impossible to give a full description of bristles in a short notice. The varieties mostly have their Russian names, indicating the locality whence they come or the trader who collects them. Germany also sends us bristles, but they are inferior both in quantity and quality to the Russian goods, and are generally unfit for making good painting-brushes, and are used only for making the common ones. Bristles vary in length from about 2in. to 9in., and sometimes 10in., but when they exceed 6½in. they are generally weak and appear impoverished. They are of several colours—white, many shades of yellow, black, and a mixture of the above called greys. Although brushmakers can detect no difference in the properties of variously coloured bristles when they are of the same quality and length, yet the painter usually prefers to have his brushes all white bristles, simply because he knows he is less liable to be imposed upon by having horsehair or bad bristles palmed upon him in lieu of good ones. This fact alone has caused so great a demand that the price of the white bristles has risen very high indeed. The market value of bristles depends on colour, length, quality, and solidity; the white, the long, the stiff, and the solid of the different sorts fetching the highest prices, but as the cost of rough bristles varies from £6 to £70 per cwt., it is impossible to give any general quotation for them.

The bristle which is best adapted for painting-brushes is first Siberia, the present value of which in the rough is £32 to £33 per cwt. This is considerably higher than they have ever reached before, and there is no reason for supposing they will be lower. Bristles must yearly increase in value, because their production is limited, and as civilisation advances the demand for them becomes more extensive. During the last three years the prices have been as follows:—In 1866, £28; in 1867, £29 10s.; in 1868, £31; and in 1869, £32 per cwt.; being a rise of 14¼ per cent. in that short time. The best painting-brushes are made of bristles entirely, but unfortunately in the brush trade, as in many others, adulteration is freely carried on, and so cleverly that it requires a practised eye to detect the fraud. Bristles are so peculiar, and like feathers, have such distinct characteristics, that there are but two materials yet discovered with which they can be mixed without immediate detection. These are horsehair and the fibre of the American aloe.

When horsehair only, and in small quantities, is mixed with bristle, its detection in the brush is very difficult, and requires a very careful examination by an experienced person. No rule can be given by which a painter could obtain a reliable result; he, however, soon discovers there is something wrong when he comes to use it. It is only when a large proportion of horsehair is used that he can suspect or discover it, the brush being limp and without spring, and instead of wearing square and even at the point or end, will twist part one way and part another and become utterly useless; but to detect horsehair readily before using the brush he would have to become practically acquainted with both horsehair and bristles.

Fibre, alone and in combination with horsehair, is largely used in the manufacture of the lower class of painters' brushes; this fibre is from about 10 to 20in. long, of a whitish colour naturally, but may easily be dyed to suit the various purposes for which it is used, and being about one-tenth the value of the bristle it is made to represent, offers great temptation to the unscrupulous trader.

It is astonishing how many thousands of painting-brushes are made annually, for home consumption only, which most likely do not contain as much as one-third bristles, and these of the poorest quality, the remaining two-thirds being horsehair and fibre. Yet they look well when hanging in the shop windows, where they are marked perhaps 2d. or 3d. less than the price of the best article.

Now the vegetable fibre can be easily detected, even though a small proportion only is mixed in the brush; the brush loses elasticity, the fibre bending easily enough, but will not spring back again; it is harsh to feel. If a few bristles are rapidly bent at a sharp angle, they will soon resume their original positions, while the fibre remains bent; the surface of the fibre is not so smooth as bristle, it has less tenacity. If a suspected hair is pulled out of the brush, and the end burnt in a small flame, it will curl up, the smoke having the peculiar odour of burnt hair if it be bristle or even horsehair, but if it be fibre it will burn away, leaving a delicate white ash.

Fibre is very useful when made into stock brushes for rough lime whiting, or for encaustic work, as the alkalies do not soften it, while they gelatinise bristles.

An idea prevails among painters that whalebone is used as a substitute for bristles, but such is not the case. To cut and prepare whalebone to be as fine as bristle would bring up the cost to more than the genuine article. It is only used for such brushes as are required exceedingly stiff and coarse.

From the above it is very difficult indeed to detect adulteration, unless such a large proportion of horsehair or fibre is used as will destroy the strength or elasticity of the brush. We will therefore mention the chief points to be noticed in selecting brushes. A good painting-brush, either round or oval, should be made of straight bristles having an inclination to turn to the centre when viewed endwise. The extremity of the brush should be soft; if harsh, bend the bristles sharply to test for fibre, as explained above. The bristles should feel solid to near the end, though tapering slightly all along, and the brush should have a good spring.

The apparent size of the brush is no criterion of value; the better the bristles the heavier and closer they will lay together. Nothing is easier than to make a brush look a size larger than it really is.

The handle should not be too large, nor must the end project above the binding; it should be a little below, so that the binding may cause the bristles to close over the handle and be divided towards the centre; if, on the other hand, the handle projects above the bristles are separated, and the brush will most likely work with a forked or swallow tail; thus, before the brush is hardly worn out, it will become useless for good work; not only so, but the loss of time consequent on the extra labour required to lay off the work smooth and even will very soon swallow up the price of a dozen well-made brushes. Common brushes are usually made in this way to give them a fuller appearance. Another trick with the handle is to make the large end trumpet shaped, so that while there is a large proportion of wood within the brush, the external handle appears very small. The handle should always be shaped in conformity with the brushes—for round brushes, round handles; oval brushes, oval handles; flat brushes, flat handles; yet to save expense, most of the oval brushes are made with round handles; which destroys their usefulness by weakening the sides on which the brush is worked, and thus causing them to work unevenly. The high price of bristles, and its continued advance, has led to many devices for meeting the emergency; the most notable and valuable of which is the socket principle for ground brushes and dusters, by means of which a shorter bristle is made to answer the purpose of one an inch longer. So high is the present price of 6in. and 7in. bristle that old fashioned brushes would cost about one-third more than the present socket-brushes; consequently they are seldom made. Messrs. Hamilton and Co., manufacture most of their painting-brushes with C. A. Watkins' patent sockets, which are made of fine wire, soldered together, instead of string, which is merely glued. The patent sockets are much stronger than any other form of binding, while they are lighter than the string-bound brushes when in use, because they do not absorb water, and may be cleaned as often as is required without danger of cutting the binding. The socket principle can only be applied with advantage to the usual round and oval paint brushes.

Distemper stock brushes, lime brushes, and other similar brushes having always been fastened by a narrow binding of wire, string, or leather, fixed close upon the root end of the hair, do not allow of any alteration in this respect; but the method employed by Messrs. Hamilton and Co. for securing the binding of distemper brushes deserves a passing notice. Instead of the wire being held on the handle by a small notch cut in the wood, the breaking off of which destroys many a brush, they make a solid notch of copper, which is fastened to the handle; the wire is wound on to the copper below the notch, and the whole is soldered firmly together. The result is that these brushes are the most serviceable that are made, and the wire never gives way, even though they are beaten heavily against the pails, as labourers are accustomed to do with them, and will stand any amount of rough usage; an important consideration this to the employer.

We may mention that except the handle be broken, these brushes do not require retying, for should the hair slip down through getting too dry, it is merely necessary to push it back again, and carefully place the brush flat in water for a couple of hours, when it will be as good and sound as ever.

(To be continued.)

Roman Antiquities.—Six admirable statues in bronze, representing respectively Saturn, Jupiter, Mars, Minerva, Apollo, and Castor, have just been discovered at Ostia, a small town situated at the mouth of the Tiber; also an enormous gold ring, which the effigy and inscription denote to have belonged to Trajan. A very beautiful column has been discovered in the excavations on the Palatine. The explorations are still being proceeded with at Pompeii, and some interesting objects have lately been discovered, including a very rare glass oil lamp, a still rarer and perhaps unique object consisting of a small terra-cotta cup with a metallic cup inside containing a night-lamp like those in modern use; a large gladiator's sword, with the metallic portions of the scabbard; many copper and silver coins of the time of Vespasian, and an amphora full of small onions near the skeleton of a woman. The skeleton of a man was also discovered, holding a pick-axe in one hand, an iron bar with the other, and with many bronze objects scattered at his feet, near a wall which had been partially broken through.

The Surveyor.

PRINCIPLES OF LEVELLING.

(*Continued from page* 261).

IT has been already remarked that a fluid surface, A B C, in a state of repose, is spherical and truly level at every part; consequently any arc, A B C, coincident therewith, or any arc, A_2 B_2 C_2 parallel thereto, is the line of true level, all points in either being equidistant from the earth's centre O. If, therefore, a levelling instrument B_1 B_2 were capable of tracing the true level line B_2 A_2, then because the radii O B_2, O A_2 are equal, the true difference of level between any two points B_1 A_1 would be the difference between the heights A_1 A_2, and B_1 B_2, or A_1 A_2 — B_1 B_2. But since a levelling instrument can only trace the apparent level line B_2 A_3, which is a tangent to the true level line B_2 A_2 at B_2, then because the radius O A_3 is in excess of the radius O B_2 by the height A_2 A_3, due to the earth's curvature, the true difference of level between the two points B_1 A_1 would be the difference between the heights A_1 A_3 and B_1 B_2, minus the excess A_2 A_3, or (A_1 A_3 — B_1 B_2) — A_2 A_3. The value of A_2 A_3, at any distance from B_2, may be determined as follows:—

Let O be the earth's centre, O B_2 its radius, and B_2 A_2 an arc of its circumference; and let B_2 A_3 be the tangent, and O A_3 the secant of the arc B_2 A_2. Then the arc B_2 A_2 is the line of true level, the tangent B_2 A_3 is the line of apparent level, and the excess A^2 A_3 of the secant O A_3 above the radius O A_2 is the height of the apparent above the true level with reference to the point B_2.

Now, according to Euclid, (3, 36), the tangent B_2 A_3 is a mean proportional between the entire secant O A_3 and its external segment A_2 A_3. Then, if the tangent B_2 A_3 be denoted by t, the arc of distance B_2 A_2 by d, the radius O B_2 by r, and the height A A_3 by h, we have

$$(2r + h) : t :: t : h,$$
$$t^2 = (2r + h)\,h,$$
$$\therefore h = \frac{t^2}{(2r + h)}$$

But since in levelling operations the height is almost nothing compared with the earth's diameter $2r$, and since the distances of the arc d and the tangent t do not sensibly differ, $2r$ may be substituted for $(2r + h)$, and d for t, without any appreciable error. Then, with these reductions, we have

$$2r : d :: d : h,$$
$$d^2 = 2r\,h,$$
$$\therefore h = \frac{d^2}{2r};$$

that is, the difference between the true and the apparent level h is equal to the square of the distance d^2 divided by the diameter of the earth $2r$; and consequently h is always proportional to d^2, since $2r$ is a constant quantity.

For the preceding formula another much more convenient for calculation may be found thus:—Taking $2r$ to be 7912½ miles, equal to the mean diameter of the earth, and the resistance d to be one mile, equal to 5280ft., the height of the apparent above the true level $h = \frac{5280}{7912\frac{1}{2}} = \cdot6673$, or ⅔rds of a foot for one mile, whence we have

$$h = \tfrac{2}{3}\,d^2;$$

that is, the correction for curvature h in feet is two-thirds of the square of the distance d^2 in miles. The following are examples by this formula:—

At two miles:

$h = \frac{2}{3}\,d^2 = \frac{2}{3} \times 2^2 = \frac{2}{3} \times 4 = 2{\cdot}666$ft.;

at three miles:

$h = \frac{2}{3}\,d^2 = \frac{2}{3} \times 3^2 = \frac{2}{3} \times 9 = 6$ft.;

and at four miles:

$h = \frac{2}{3}\,d = \frac{2}{3} \times 4_2 = \frac{2}{3} \times 16 = 10{\cdot}666$ft.*

The preceding correction for the earth's curvature is made on the supposition that the ray of light which is reflected from the point on the staff intersected by the horizontal line of sight of the telescope proceeds to the eye in a perfectly straight line, and that the point observed in the line of sight is in that line. But this is not absolutely true. For the ray moves from the point on the staff to the eye in a slightly curved line, convex upwards, and the visual line is a tangent to this curve at the eye, consequently the point is actually somewhat below where it is seen. This may be explained as follows:—

In vacuo, and in all media of uniform density, the rays of light which issue from luminous objects† move in straight lines; but in all media of variable density they move in broken or curved lines. Thus, if the atmosphere did not exist, or if it were everywhere of uniform density, the line along which the ray would proceed from the horizontal point on the staff to the eye would be a straight line, the visual line between the eye and the point would be identical with the ray, and the point seen in the line of vision would be where it is seen. As however, the air may be supposed to be divided into strata, gradually decreasing in density from the earth upwards, and as the earth's sphericity perpetually changes the inclination of the strata, the ray, while passing from the point to the eye, obliquely through the strata, thus varying in density and inclination, is gradually reflected or bent more and more from a rectilineal direction into a vertically curved line concave towards the earth. Hence the line of vision is a tangent to that part of the curved ray that enters the eye, and continues to diverge from the curve the further it is produced; and hence the point seen in that line is not where it is in reality, but above that position.‡

This apparent elevation of the point is called *the error from refraction*, which is equal to the angle contained between the straight line drawn from the point to the eye, and the tangent to the refracted ray where it meets the eye.

Let B_1 B_2 be a levelling instrument set up over the point B_1; C_1 C_4 a levelling staff placed on the point C_1; B_2 C_2 an arc, or the line of true level, concentric with the earth's curvature B C; and B_2 C the line of apparent level tangential to the arc B_2 C_2 at B_2 and along which the ray would proceed from the horizontal point C_3 to the eye at B_2 if the atmosphere were of uniform density.

(*To be continued.*)

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* As distances are sometimes measured by Gunter's chain of 66 feet, it is desirable to have formulæ that will give the curvature h in feet, and also in inches, when the distance d is taken in chains. Now since 80 chains are equal to one mile the formula

$$h = \frac{2}{3}\left(\frac{d}{80}\right)^2$$

Gives h in feet when d is measured in chains. Thus if d = 47 chains, then

$$h = \frac{2}{3}\left(\frac{d}{80}\right)^2 = \frac{2}{3}\left(\frac{47}{80}\right)^2 = \frac{2}{3} \times \cdot5872^2 = \frac{2}{3} \times \cdot34515 = \cdot2301 \text{ of a foot.}$$

The formula

$$h = \frac{d^2}{800}$$

Gives h is inches when d is taken in chains. Let d = 32 chains, then

$$h = \frac{d^2}{800} = \frac{32^2}{800} = \frac{1024}{800} = 1{\cdot}28 \text{ inches.}$$

† An object is luminous either by its own light, or by the light incident upon it from a luminous object. It is visible only when it is luminous, and is not then luminous by any sympathy between the eye and it, but by the light which proceeds from it to the eye. When, therefore, an object is luminous, rays of light issue from every point of it, radiate in all directions, and are imbued with its form and colour. Those rays which strike the eye are refracted by its lenses, and paint an inverted picture of the object on the retina, whence the optic nerve transmits the impression to the brain—the process throughout being almost instantaneous.

‡ Atmospherical refraction is of two kinds, namely, astronomical and terrestrial. The former elevates the sun, moon, and stars, and the latter all objects on the earth's surface, above their true places. In the zenith there is no refraction, because a ray of light coming from an object in that direction passes vertically through the atmospheric strata, or cuts their tangent planes at right angles, but it gradually increases thence to the horizon, where the air is most dense, and a ray traversing it from an object in that direction intersects the variable strata most obliquely, and is most refracted. The mean quantity of refraction in the horizon is 33′, and as the diameter of the sun and moon are about 32′, it follows that the upper edges of their discs are in reality below the horizon when their lower edges appear resting on it. Hence it is owing to the refracting power of the air that the sun is always seen above the horizon before he has risen and after he has set, advancing the morning and producing its aurora, prolonging the evening, and causing its twilight, and tinting the clouds and the mountain tops, with crimson, purple, and gold; that night, in fact, is made to pass so beautifully and imperceptibly into day, and day into night, without changing suddenly from the one to the other.

PARLIAMENTARY NOTES.

THE THAMES EMBANKMENT.—Mr. W. H. Smith, on Monday, asked the First Lord of the Treasury whether he had received a memorial from the Dean and Chapter of Westminster, the Vestry of S. George, Hanover-square, and numerous representative bodies of the metropolis, against building upon Crown land lately reclaimed from the Thames by the Thames Embankment at the expense of the ratepayers of London; and whether he would give the memorialists an assurance that no arrangement should be made for the appropriation of the site until after the publication of the annual report of the Commissioners of Her Majesty's Woods, Forests, and Land Revenues.—Mr. Gladstone: This motion, as I understand it, does not refer to land which the Board of Works have reclaimed from the river, but to land in possession of the Crown. I am told that I cannot say absolutely that no arrangement shall be made until after the publition of the annual report of the Commissioners of Woods and Forests, inasmuch as that would throw us over till a very late period of the Session. However, it is possible that nothing may be done until then. Meanwhile, if anything is done, it will be in the shape of a proposal for a vote by this House, and ample notice will be given, so that all parties will be able to express their opinion upon it.

METROPOLITAN DISTRICT RAILWAY.—Mr. SHERRIFF asked the First Commissioner of Works whether any authority had been given for placing in a Committee-room of the House a model purporting to be that of the works proposed by the Metropolitan District Railway Company in Queen Victoria-street, City, but different from the model produced before the committee on the Bill for the said works; and, if so, whether, before such authority was given, means were taken to ascertain whether the railway company admitted the correctness of the said model?—Mr. Ayrton said the Palace of Westminster, like all other palaces, was presumed to be in the occupation of Her Majesty, and its use was regulated by the Lord Great Chamberlain. The duty of the department with which he himself was connected was confined to those works which were necessary in the building, and to furnishing it for the purposes which the Lord Chamberlain might design. Ordinarily, with regard to any part of the Palace which was used by either House of Parliament, the high officers of each House gave such directions as were necessary; but when application was made for any special use of the building, the requisite authority was granted, not by either House of Parliament, but by the Lord Great Chamberlain. In the present case it was by the officers of the Lord Great Chamberlain's department that the sanction necessary to enable the model to be exhibited had been given. They did not, of course, inform themselves as to the accuracy of the model; the responsibility on that head resting with the persons who proposed to exhibit it.

THE MASON STATUE.—The Committee of the Birmingham Town Council entrusted with the selection of the designs sent in competition for the Mason statue, Birmingham (referred to in THE BUILDING NEWS a fortnight ago), have chosen the work of Mr. Papworth, which represents the founder of the Erdington Orphanage welcoming a ragged orphan. The selection does not appear to have given much satisfaction in the town. Mr. Phillips's design is said to have been the most popular. The cost of the statue will be about £1500.

ON ETRUSCAN ART.*

In taking up the study of Etruscan art, the first question which presents itself to us is, Who were the Etruscans? There can be no doubt that they were of Aryan origin; some, however, say that they were Phœnicians, others that they were Egyptians, while some assert that they were Teutons, and some that they were aboriginal Kelts. The Etruscans, as represented on many drawings in Hamilton's collection of old Etruscan pottery, appears as a race of men with Mongol features—flat heads, projecting cheek bones, and pug noses, in conflict with a higher Aryan-like race. It seems then, from this evidence, that a mixture of the Mongols and Aryans produced that totally different type from either Greeks or Romans. Two distinct immigrations are recorded, the first about 1650 B.C., when Pelasgians and Thyrrenians settled in Etruria; and the second about three hundred years after Homer and as many years before Herodotus, in the time of Thales and Lycurgus, about 800 B.C. The second time they appear to have established themselves in Italy, organised a society, and adopted Greek mythology and writing. The differences in their mythology are easily explained by the influences which their connection with the Egyptians and Persians must have exercised on their mode of thinking. That the Etruscans were extremely well-versed in Grecian lore, and also in the later Grecian history, is without doubt. They record the expedition of the seven heroes against Thebes, as seen on carniols in the Stosch Museum. They have on their burial urns scenes from the battle of Marathon, and their Echetlos is to be seen represented as he appeared suddenly in the battle, armed only with a plough, and driving the Persians before him, for which valorous deed he received the name of Echetlos, and was honoured by the Greeks together with all the other leaders in the celebrated battle. But no record of this incident is to be found on any Greek monument, which goes far to prove that very early a close connection existed between Greeks and Etruscans. Whilst the Greeks, after the Trojan expedition, suffered very much from internal dissensions, the Etruscans appear to have enjoyed a long peace, and peace quickly developed a special kind of Etruscan art, in a certain degree original, bearing, however, the stamp of Asiatic and Egyptian influence. The Etruscans very early devoted all their energies to pottery, and as the Chinese are called the potters of the East, the Etruscans may be called the potters of the West. I therefore am inclined to assume that many vases ascribed to the Greeks have been Etruscan productions. In burning, painting, and fashioning clay, the Etruscans appear to have acquired from time immemorial a kind of speciality, and there is nothing to contradict the assertion that they, by degrees, perfected this speciality so that their trade in vases extended all over the then-known world, and that even the Greeks preferred to furnish their houses with Etruscan pottery to fabricating it themselves. Besides that, we know that the Greeks looked upon the making of pottery as a kind of low handicraft, and with the wealth of marble which they possessed, they preferred to devote themselves to architecture and sculpture. The learned professor Domenico Valeriani very forcibly propounds all this, and I see nothing very hypothetical in it. The gloomy mythology of the Etruscans appears to bear out the assertion that they were inclined to a melancholy superstition, better fitted for potters fabricating dark vases with red figures on them, or red vases with black figures, than for sculptors handling white marble. They sighed under the superstitious principles of the day, which frightened them with terrible conceptions of the Divinity. They had two sets of gods—the veiled gods, with Asar at the head, representing the cosmogonical forces: fire, water, the creative power, like the divinities of the Indians or those of the Egyptians with Amn at their head (the concealed god, or air), and then twelve lower divinities presiding over the order of all existing and visible things. All this has a great resemblance to the Scandinavian lore with which we were made acquainted some two thousand years later. The Etruscans believed in a hell, but not in an Elysium. The whole of their creed was devoid of a comforting union between God and man. All their divinities were conceptions of horror. These impressed the people with a ferocious character, which clearly appears in the legend that their priests attacked the Romans with live serpents and burning torches. At their funerals they had no dances, but sanguinary battles. Not less than twelve different thunderbolts were known to them, viz.: those of prophecy, authority, law, wish, admonition, approval, help, prosperity, falsehood, plague, murder, and threats. They have in their mythology a record that the Cyclops forged in the subterranean black kitchen of the Ætna the thunderbolts for the use of the incomprehensible First Cause. They had a whole thunderbolt ritual, every day in the month bringing thunder had its special signification. All the concealed gods had the power of thundering, and nine out of the secondary gods could do the same, says Pliny, but he forgets to give us the names of these divinities. The conception of an everlastingly angry, jealous, persecuting, thundering and lightening divinity had very much in common with the Jewish conception of Javeh and with the Northern incarnation of Thor. The Etruscan belief that aërolites were thunderbolts sent by the angels against the Titans has a great analogy with the Persian legend assuming the same to have been done by the Fervers against the Devas. Another peculiarity is observed in Etruscan divinities, viz., that they are nearly all winged, like many of the Zend, Assyrian, and Babylonian divinities, rulers and priests. Jupiter, Diana, Minerva, (who, with the Etruscans, was a kind of lady Mercury, and had not only wings on her shoulders, but also on her feet), and Venus, are all winged. Others, like Proserpine, Eros, and the Furies, have wings on their heads. Winged genii are plentifully seen on their subterranean graves in the old Etruscan town of Tarquinium. According to Dempster, even cars are provided with wings; but therein the Greeks agree with the Etruscans, for Euripides, in his Orestes, speaks of the winged car of Phœbus, and on some old Eleusian coins Ceres is to be seen sitting in a winged car drawn by two serpents. Plenty of such winged cars are found on the vases in the Hamilton collection. Some of the Etruscan divinities have an Egyptian type. There are two brazen tablets representing Isis and Osiris in the Museum Chiusini (Clusium). We have a small winged Harpocrates as Eros, with his forefinger on his lips, a lotus on his head, and a cornucopia in his left hand. Their jars are of Egyptian form, representing sphinxes, women, their drinking cups in the form of legs, with human faces on them, and Mercuries with pointed beards. As far as all this goes we can trace in Etruria an Eastern as well as a Greek influence. Etruscan architecture took its origin in wooden construction. The ground plan of an Etruscan temple formed a square. The front had a deep colonnade, while the temple itself was divided into three cellas, the central of which was broader than the others, and each of them contained the image of a Divinity. More celebrated than their temples were their burial places. The most simple of them belong to the primitive form which in all quarters of the globe has been preserved—mounds formed of earth and stones, sometimes with conical columns rising above them. Such mounds with columns are seen at Vulci under the name of *cucumella*. The *Nuragha* on the island of Sardinia are tower-like stone buildings of a conical form, containing in the interior many chambers. Other tombs are cave-like, hewn in the rock or hollowed out as simple chambers; the ceilings, which are supported by pillars, are often found having on them imitations of wooden rafters. The dead were buried in full armour, vases and other vessels surrounding them. The walls of these tombs are often covered with decorative paintings. Such tombs exist at Corneto, Vulci, Cere, Tarquinii, and other places. On some of them the outside is ornamented with façades chiselled out of the rock. All this certainly reminds us of an Egyptian Necropolis. I may remark that fortifications were brought by the Etruscans to a great artistic perfection, proving their matter-of-fact character. In the old city walls of Cossa, Populonia, Todi, we plainly perceive an advance from the polygonal Cyclopean construction to the regular freestone building. We find, too, gates for the first time constructed in the form of arches of wedge-shaped stones, producing by their span a firm vaulted construction. The old gate of Volterra is of this kind. The Etruscan architecture acquired a lasting merit in the history of art by the new epoch which it introduced by this progress in technical construction. By degrees, the Etruscans became the fashioners in clay and the bronze manufacturers of ancient times. Not only vessels, but gods, were moulded in clay or cast in bronze, as is to be seen by the numerous specimens found in the museums of Europe. The style of these, however, is rude and heavy, showing everywhere a distorted conception of the human body. As Greek towns were said to have contained a double population, one half living and the other in marble, the same may be said of Etruscan towns, only in Etruria bronze occupied the place filled by marble in Greece. Of such works we possess a fantastic Chimera at Florence—a fabulous monster, a symbol of a volcano in Lycia, composed of a lion, a goat, and a serpent, because it was said that lions dwelt at the top of the mountain, goats peaceably grazed half way up its sides, and that below it poisonous serpents had their abodes. Then we have a she-wolf in the Capitoline Museum at Rome, the Mars of Todi in the Vatican Museum, a boy with a goose under his arm in the Museum at Leyden, and a draped male figure in the Uffizzi at Florence, these are the most characteristic specimens of Etruscan art. Everywhere the animal forms are distinguished by a vigorous naturalness, although hard in the mode of execution; but the human figure, from a scrupulous and constrained conception, and from an exaggerated attention to detail, exhibits a cold, lifeless appearance, utterly wanting in the animating spirit of truth. We see, then, that the Etruscans were more distinguished in works which required technical skill than in those which take their origin in the higher flights of imagination. Their religion, their gloomy views of life and nature, forced them to keep their human figures heavy, compact, and oppressed, devoid of that free and easy harmony which distinguishes Greek art. In their sculptures they always wavered between weakness and a hard style of execution. How undeveloped their sculptures were may be judged from the fact that in many instances the feet of their figures were placed in profile, whilst the upper part of the body faced the front, which peculiarity appears in many early sculptured representations of Christian saints. Such figures have often, too, their feet to the north, whilst their faces are turned in the very opposite direction, making us believe that they walk to the south.

* Abstract of a Lecture delivered by Dr. Zerffi at the South Kensington Museum, March 29, 1870.

OUR ILLUSTRATIONS.

One illustration this week consists of a sketch of the inner door, south porch, S. Saviour's Church, Dartmouth, drawn and sent for "The Building News Sketch Book" Series by Mr. Henry J. Snell, of Plymouth. Mr. Snell sent no other description than what appears in the sketch.

Our other lithographic illustration shows one of the "English Country Houses" by Mr. William Wilkinson, of Oxford, to which we particularly referred in our first article a fortnight since. Bignell House, which we have reduced by the photo-litho process, may be regarded as a fair sample of the illustrations in Mr. Wilkinson's book.

Instruments of Horse Torture.—At the Royal Institution, on Friday night, on the occasion of Professor Huxley's lecture on the horse there was exhibited a number of large razor-edged flint stones, some with frightfully jagged edges with most terrific points, and many of them of great size. These were picked up from the roads as specimens of the cruelty inflicted on horses at the present time. The inscription upon the black board to which they were attached was as follows:—"Instruments of Horse Torture employed in the Nineteenth Century on the Roads of the South of London, within the four-mile radius of Charing-cross. April, 1870." The indignation felt was very great that such frightful barbarism should be practised at the same time, when by the adoption of the steam roller by the public bodies all these sharp stones could be pressed into the earth, and a perfectly flat and even road be made in a few hours. It is to be hoped that this session will not pass over without a short bill making the use of the steam roller compulsory on all public bodies laying down loose stones.

Inner Door South Porch St Saviour's Church Dartmouth

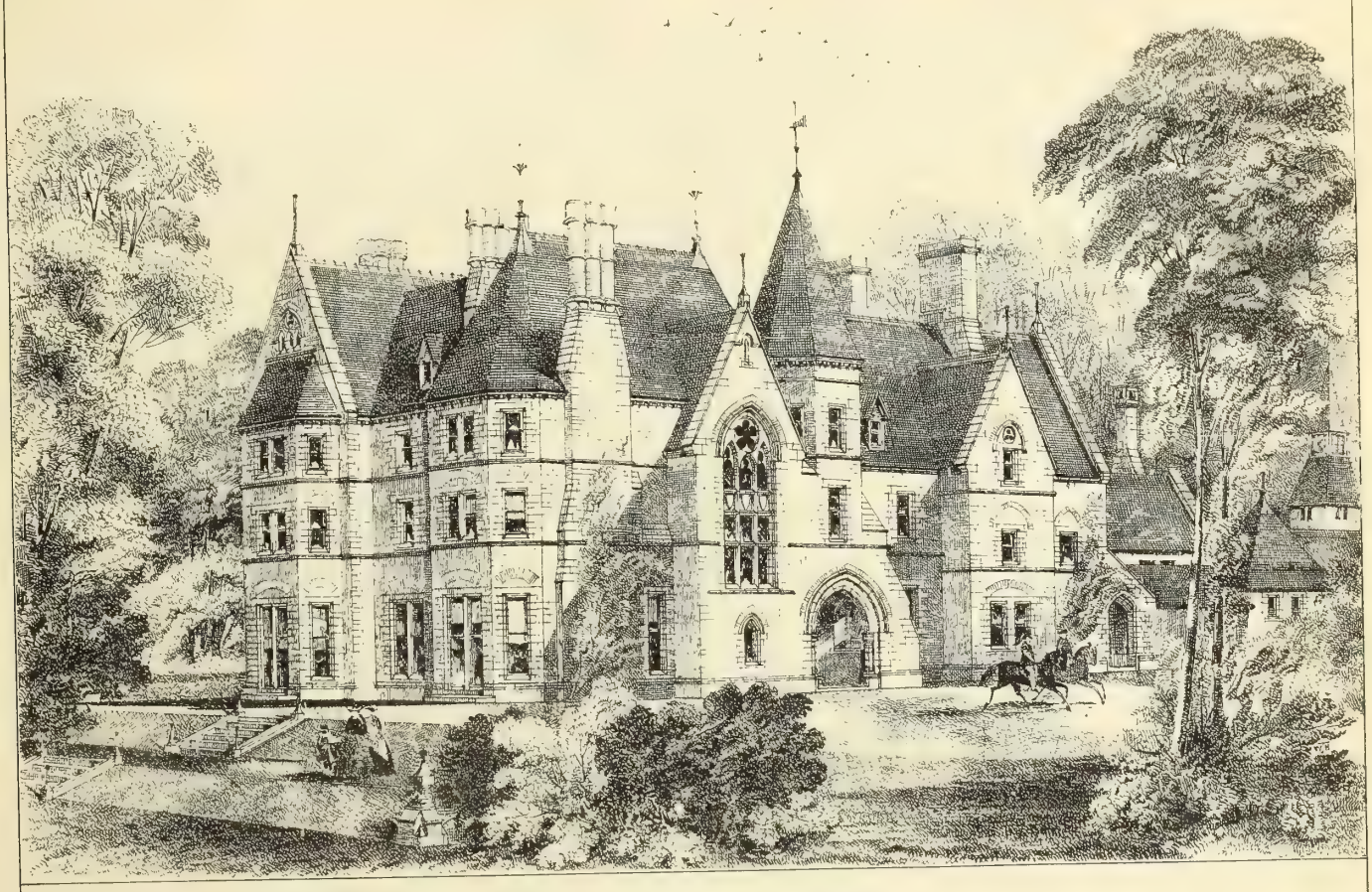
The date 1631 refers to the year in which the existing oak door was made. The ironwork is very much older, and belonged to original door. The leopards are part of the ancient arms of Dartmouth

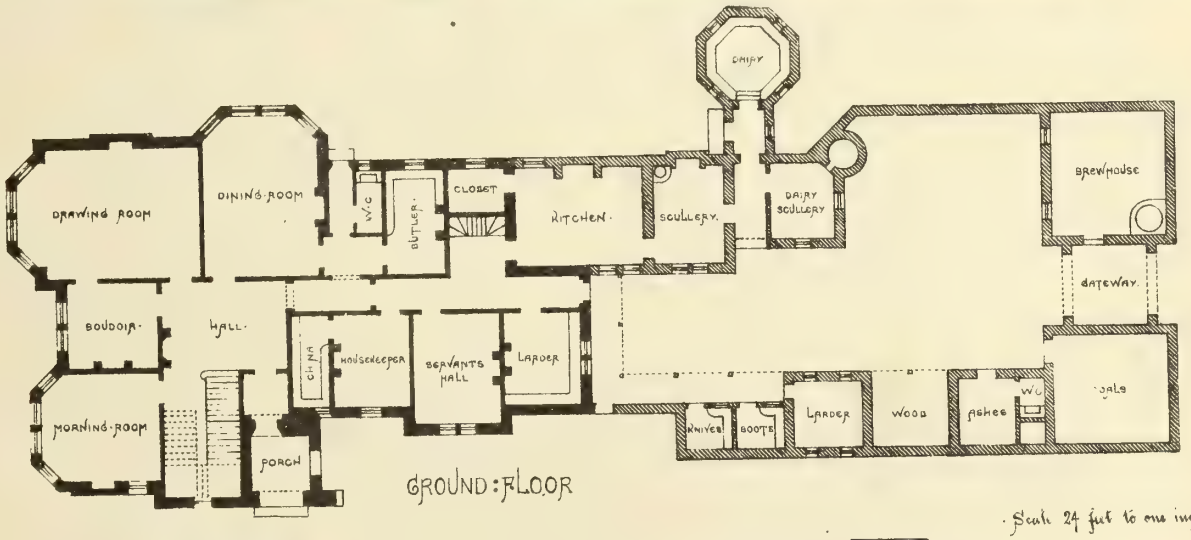


SCALE OF FEET

ins. 10 6 0 1 2 3 4 5

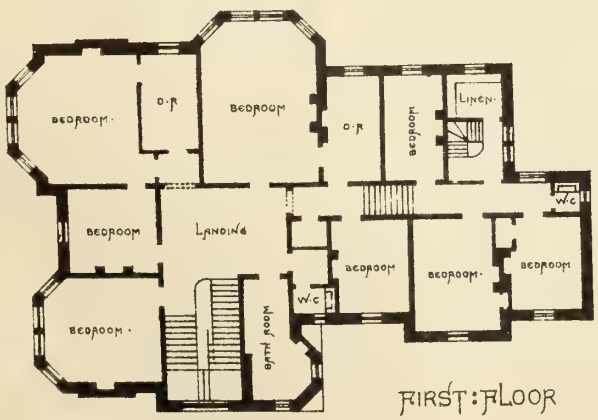
Photo-Lith. Hanhart, Wiltemann & Bass, London



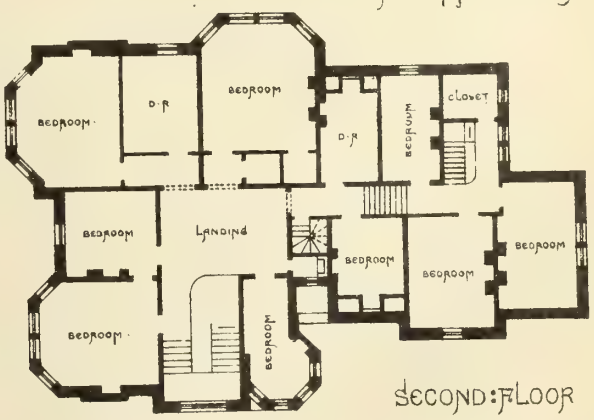


GROUND : FLOOR

Scale 24 feet to one inch.



FIRST : FLOOR



SECOND : FLOOR

Photo. Lithographed by W. Newman & Bass, London.

W. Wilkinson Architect Oxford

BIGNELL : HOUSE : OXON

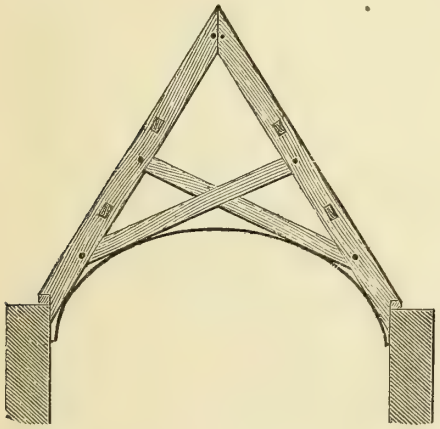
BRIEF CHAPTERS ON BRITISH CARPENTRY.

By Thomas Morris.

(*Continued from page* 268.)

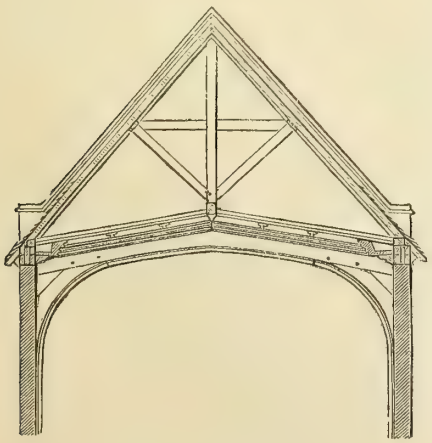
DISREGARDING strict chronology, it will be more serviceable here, than later, to notice two or three examples that seem to prove conclusively the strutting and anti-tying principle of ancient timber work. At the church of Old Basing there are principals with cross struts of bent timbers which could exert no appreciable influence in a pulling or tying direction. This example also displays purlins and arched wind braces, so that the common rafters are reduced to a secondary importance, and rest upon a framework instead of being self-sustaining.

The roof over the Council-room at Crosby Hall, London, of the fifteenth century, has the saltire struts, making each pair of rafters complete without ridge or purlins; but it was intended to be concealed, and the struts are straight.



Roof over Council-room, Crosby Hall.

Again, in the domestic chapel of the archi-episcopal palace at Croydon, a late erection, with panelled ceiling, the principal beam or girder is converted into a very flat-pointed arch by supports at the haunches from the wall-posts, and the back of the girder has a considerable rise towards the centre. It thus presents a convexity where subjected to cross pressure. On the apex of this beam stands a crown-post with a horizontal cross strut at half its height, supported at the ends by raking struts from the centre of the chief beam, giving a firm rest for the purlin. There is no attempt to relieve the centre, but the full share of weight is thrown upon a timber fortified for its reception, and especially adapted to convey it safely downwards.



Roof of Chapel, Croydon Palace.

In order that the noble works of our ancient carpenters may be appreciated, intelligently repaired, or successfully imitated, it is essential that their constructive principles should



Roof of Old Basing Church, Hants.

be rightly comprehended; and it has seemed the more allowable and necessary to insist upon a clear and explicit understanding on this point even to iteration, because those principles have to a great extent ceased to be of common adoption. I shall now proceed to exhibit their application in some of the grand monuments of an art for which our native builders were held in paramount honour—works that have been nowhere surpassed, and rarely approached, by contemporary artists of other nations.

The roof of Westminster Hall opens a new era, and so magnificent an example deserves the most considerate attention. The foundations of this grand room are referable to William Rufus, who held his court here on returning from Normandy in 1099. The detailed form of his building can only be judged of by analogy, and the strongest probability attaches to the tripartite arrangement of Oakhampton, Hereford, and other coeval instances. The late Mr. John Rickman, assistant clerk of the House of Commons, printed a pamphlet quoted by Brayley, to show that the difficulty of explaining in what manner such a span of roof could have been supported before the flying buttresses were erected was done away with by the development in 1820 of an ancient triple doorway at the north end, indicating that the hall was originally divided by pillars of wood or stone, so as to form a nave and side aisles in the manner of a large church. Flying buttresses belong to the thirteenth century, and were utterly unknown as a separate building expedient in the eleventh; although virtually the arched ribs of aisle roofs were flying buttresses to the nave against whose walls they abutted. Roofs of great span were altogether incompatible with the condition of mechanic skill in the Norman age, and the long gallery-like form of all considerable apartments was the inevitable and attesting consequence. Before the usages of those early times had been wholly discontinued, when the hall "used in the day for the patriarchal hospitality of the owner became at night a sort of stable for his servants," little inconvenience may have attended the slight separation of side and central portions, but with greater delicacy of manners new arrangements of domestic interiors were adopted, and when distinct sleeping apartments were provided the old columnar divisions of the hall became more than ever obstructive and obnoxious.

Had the capacity for spanning a room nearly 70ft. wide been anywhere achieved in the time of William the Second, the very inferior displays for 250 years afterwards must have been precluded. Mr. Sydney Smirke cannot perhaps be said to have combated this notion by merely stating that no vestiges of foundations for columns were found in the course of repairs conducted by Sir Robert and himself, and that rooms of equal width had been covered by single roofs in Italy. Mr. E. J. Carlos suggests that if wooden columns, as at Nursted, were employed, the non-discovery of foundations might be easily accounted for, and both he and Mr. Twopenny incline to the hypothesis of divisional supports of some kind. Wooden posts were earlier in use, it may be, than stone columns, but the latter are more in unison with the general conception of a royal palace of the time, and their complete disappearance seems the less calculated to excite surprise, as a patent was directed in 1394 to John Godmerstone to repair the great hall and sell old materials; so that it may be received as certain that whatever was unsuited to remain or was capable of being again worked up, should have wholly disappeared from its original situation. Mr. Smirke tells us, indeed, that much wrought stone was discovered among the ashlaring of Richard the Second's time. He says, also, "That the roof (that of Rufus) was not similar to the present one is indisputable, for the external buttresses which resist the pressure of the present principals formed no part of the Norman walls, nor can we point to any evidence of practical skill in carpentry on the part of the builders of William the Second's age equal to the execution of so bold a task." (Archæologia, Vol. 26).

The Palazzi della Ragione or Halls of Justice at Vicenza (operated upon by Palladio) and Padua afford no real precedents for Westminster, and though of ancient Gothic character, have most likely undergone similar changes. That at Padua was built by Pietro Cozzo between 1172 and 1219. "A vast roof like that at Vicenza towers above the edifice, rising perhaps half as high again as the walls upon which it rests. This roof is said to be the largest unsupported by pillars in the world. The hall is above 240ft. long and 80ft. wide, as much in height, and not quite rectangular." But the roof is not of the early date of the foundations. "In the year 1306 there came to Padua a renowned architect and engineer, an Austin friar, Frate Giovanni, by name. He had travelled far and wide in Europe and in Asia, to the very Indies, and he

had brought back plans and drawings of all the buildings which he had seen, amongst others a drawing of the roof of a great palace in India beyond the sea. This design greatly pleased the Paduans, and they requested him to roof their hall (which had previously formed three chambers) in like manner, and Fra Giovanni assented, asking no other pay excepting the wood and tiles of the old roof which he was to take down." (Murray's "Northern Italy"). So that this Italian discursion, instead of supporting a theory, collapses under the touch of investigation, like a house of cards. Much more ample information than has yet come to light concerning the Westminster renovation is to be desired, but of the fragmentary history one of the chief documents is that in Rymer's Fœdera, A.D. 1395, An. 18, Ric. 2, commencing "Ceste Endenture faite parentre nostre Seigneur le Roy d'une part et Richard Washbourn and John Swalwe, masons, d'autre part, Tesmoign que les didtz masons ont empris de faire bien et loialment toute la table des mures de la grande sale deinze le palays de Westmonstier d'une part et d'autre. La quele table sur montera l'ancien mure deux Pees d'assise parmy la dite mure."

These particulars show that alterations were in progress from 1394 to 1398. Nor is it at variance with the length of time commonly required for the preparation of works of such magnitude to suppose that the new roof was not only designed, but put into actual preparation, before the old building was disturbed. There was no such lapse of unnoticed years, we will assume, as between the projection and complete execution of the new roof at Guildhall; and artificers were subject to impressment; but we cannot, on the other hand, conceive as existing in the fourteenth century the organisation that produced those sudden, magic-like effects witnessed in the gigantic halls for modern international exhibitions. There must have been designs and devices, models and "patrones," forms and moulds to prepare, and trees of suitable size and curvature, it may be presumed, to select in their native seats, making the term assigned seem short. A.D. 1398 was the last of which Richard saw the end, and the manner of inaugurating the Westminster roof was more suitable to a work of entire novelty than even the most successful renovation of a pre-existing object. It took place at Christmas, and the king kept the festival "in a most royal manner, with every day justings and running at the tilt, whereunto resorted such a number of people that there was every day spent xxvi. or xxviii. oxen, and 300 sheep, besides fowle without number. Also the king caused a garment for himself to be made of gold, silver, and precious stones, to the value of 3000 markes." Beneath the same majestic roof four centuries and a quarter later took place the most remarkable display of modern pomp—the coronation of George IV., when it had undergone a thorough repair by Sir Robert Smirke with old ship oak from Portsmouth Dockyard. The walls were at the same time refaced internally with 6in. Huddlestone ashlar. The lengthening of the hall southwards, and piercing the east wall to suit the new Palace of Parliament, were done by Sir Charles Barry.

ARCHITECTURAL ASSOCIATION.

At the usual fortnightly meeting on Friday evening last, Mr. Lacy W. Ridge, President, in the chair, Mr. Foskett was elected a member, and the ordinary routine business having been transacted,

The Rev. Thomas Hugo, rector of West Hackney, gave an extempore address on

Old London Brickwork.

The rev. lecturer, in his prefatory remarks, said that a great many years ago he (then curate of S. Botolph's, Bishopsgate) perambulated the streets of London, in company with Mr. Charles Baily (then a young architect in Gracechurch-street), in quest of objects of interest to the antiquarian, the architect, and the historian. The results of those investigations were put before the world in the "Transactions" of the London and Middlesex Archæological Society, and, as was therein pointed out, the ward of Bishopsgate in the City of London was found to be particularly rich in what were then comparatively rare specimens of old brickwork. But if such works were rare twenty years ago, it might be guessed that (owing to the great changes in and the rebuilding of large portions of London) they were much scarcer in the present day. He had, in anticipation of this address, gone over the ground he had formerly traversed, and he had found that very few vestiges of interest now remained. He would not, however, take up the time of the meeting by describing brick buildings that were now no more, but would confine his remarks to the (unfortunately) few that remained. Of all things that an architect could study, brickwork was one of the most important, and any attempt to rescue old specimens of it from oblivion would be, to a certain extent, a thing of value and that was his excuse for presuming, as an amateur, to address a professional audience. After stating his belief (based upon Scriptural and other records) in the superior antiquity possessed over stone by brick as a building material, the lecturer traced its employment through Egypt, Greece, and Rome, to our own day, remarking that the brickwork of the Romans was a marvellous specimen of man's powers, and that when we knew that some of the brickwork of the Romans presented as fine a front to-day as when first erected, it made us have an extreme veneration both for the builders and for the material which they used. The material, at least, is most noble, however egregiously wrong may have been, and is, its treatment among ourselves. The ward of Bishopsgate was, for its size, the most interesting area in London to the archæologist and architect. Taking his hearers for an imaginary walk in the ward, the rev. lecturer first noticed the celebrated house of Sir Paul Pindar, in Bishopsgate-street Without, and directed the attention of his hearers to a little bit of work on the northern side of it, which he said was singularly characteristic of the time. It was Renaissance in style, as was all good brickwork of that period. This specimen, which was well worth a special visit of inspection, was now fast falling to pieces, and he was afraid that it would not long remain. The ornamentation of the London brickwork of the sixteenth century differed from foreign brickwork, being mainly characterised by the employment of pilasters, semi-engaged, caps, and cornices. An old brick building, showing in a marked degree of perfection this latter treatment, was next stated by the lecturer to be still in existence in Great S. Helens, in the labyrinthine portion of that thoroughfare between the churchyard and S. Mary Axe; in fact, Great S. Helens abounded with interesting buildings, some much older than that referred to. There was a singular building of the reign of Elizabeth there, not to mention Inigo Jones's entrance to the church. The old London brick houses in question were erected between the years 1610 and 1650, and there was no house of the kind that Mr. Hugo was acquainted with that did not state upon its face that it was of that period, or that could not be proved to be so. In S. Helen's Churchyard was another brick house of the period, but with stone pilasters and quoins; this (date 1646) was not a good specimen. The first building named as still existing in Great St. Helens had a small space left in the wall, probably intended for the sign. The buildings already named, Mr. Hugo was sorry to say, comprised all that remained of old brickwork in the ward of Bishopsgate. Passing beyond that ward, the lecturer mentioned a building in Tokenhouse-yard, which he was afraid had disappeared, although Mr. Baily told him that it still remained; at any rate, there was some doubt about it. In passing, the rev. lecturer expressed his indebtedness to Mr. Baily for much valuable knowledge, archæological and architectural, imparted in the course of the peregrinations with that gentleman before referred to. One of the finest specimens of old brickwork with which he was acquainted were situated in the Barbican, five or six doors from Red Cross-street. In this house there were the pilasters before mentioned, and a large central arch. The well-known specimen of brickwork over the archway of Gray's-inn was next referred to, and after remarking that several old frontages in Cheapside were worth notice, the lecturer said that he had frequently read with disgust and sorrow the objections made by architects against the use of brick as a modern building material. It was said with such a material there could be no light and shade—nothing which could bring credit upon the architect. In his judgment, however, brick was the most plastic of all materials; and when he saw architects complaining of the deficiencies of brick he came to the conclusion that it was a parallel case to that presented by the bad workman who found fault with his tools. In the Temple, in Fleet-street, were to be seen many gateways or archways of the extremest excellence in brickwork. He admitted to the full, however, that there was a kind of uniformity, and therefore monotony, in all brick buildings, and that, by the use of other materials, greater variety of effect had been obtained; but because architects had followed each other blindly in the use of brick, it did not follow that that material was incapable of greater things. As an illustration of what might be done to obtain greater variety in brick buildings, the rev. lecturer alluded to some of the work in the new buildings of the South Kensington Museum. He condemned the bulk of the brickwork now rising up on every hand, as displaying an egregious lack of good taste. He regretted this, because he hoped and trusted that the future of London would be a future of brick architecture, for brick was really and truly the material of which city houses should be built, if not all houses; and while it appeared to him that stone was, in general, the most suitable material for the construction of religious edifices, still, the high capabilities of brick even in this direction were shown to great advantage in the new church of S. Columba, Shoreditch, which was a genuine work of architecture. In tracing the causes of the bad quality of most of our modern London brickwork, the rev. lecturer said it was chiefly owing to the inferior kinds of brick that were now manufactured. An extensive brickmaker had told him that better bricks were not made because nearly every house was now built on a lease of ninety-nine years, and the bricks now made are considered quite equal to lasting that time. Now he (the lecturer) ventured to say that all the old buildings he had referred to were built by conscientious men, with the intention that they should last for ever. Again, the mortar now used about London and elsewhere was of the most wretched character. With such materials it was impossible to produce good work. In conclusion, the rev. lecturer strongly dwelt on the suitability of brick for modern town architecture, instancing the capabilities of the material as evinced by the splendid works in Italy of the Renaissance period.

In the discussion which followed,

Mr. Charles Baily spoke with regret of the great number of interesting brick buildings which had disappeared from London, particularly instancing one which formerly existed in Winchester-street, City, undoubtedly the work of Inigo Jones, of which he believed no drawing existed. In speaking on the history of brickwork, Mr. Baily said that all ages, from the time of the Romans down to the present day, furnished some good specimens of brickwork, and he believed that some masterpieces were executed in the material in the present day. He emphatically contradicted the assertion made by some authors to the effect that soon after the Roman legions left Britain, the art of burning earth into bricks was lost, and at some length entered into his reasons for contradicting it. In reference to terra-cotta, which, after all, was only brick, Mr. Baily said that many architects fancied that our forefathers never used a material without boldly showing what that material was, but in the instance of Sutton-place, near Guildford, all the dressings, the mullions, and the arching of the doors and windows were in terra-cotta, though apparently of stone. In conclusion, Mr. Baily remarked on the ingenuity our ancestors brought to bear on the employment of brick constructively and ornamentally, and advocated the study of old brickwork.

In the remarks which followed by various members of the Association, various points in connection with the lecture were touched upon. One was the far inferior strength of a brick column of given diameter to that of a stone column of the same dimensions; this was to some extent a bar to the employment of brick except in conjunction with stone, and the

general feeling of the meeting seemed to be that no new style would ever be worked out in brick exclusively, though the increasing popularity of terra-cotta promised to be of great service to brick architecture. Several additional existing old brick buildings in London and elsewhere were enumerated by the various speakers, and one gentleman, in reference to some of the specimens quoted by the rev. lecturer, said that the semi-attached pilasters in brickwork on the façade, though excellent in point of workmanship, were not in good taste, such features belonging properly to stone architecture. As to the rubbishing kind of brickwork so abundant in the suburbs of London and elsewhere, it was stated that it was due rather to the fact that the houses were "built to sell" than to any question of lease. A word was said in defence of London "stock" bricks, it being observed that they were very durable, hard, not very easy to cut, but good for wear and tear.

The customary vote of thanks to the rev. lecturer having been carried, the meeting adjourned.

ENGLISH & FRENCH METAL WORKERS AT THE ROMAN ART EXHIBITION.

A COMPARISON between the merits of the productions of the French metal workers and those of an English firm, Messrs. Hardman and Co., of London and Birmingham, is made as follows by a correspondent of the *Westminster Gazette* :—

"There can exist little doubt, judging even from the few specimens exposed, that the Messrs. Hardman and Powell still retain their position as the first ecclesiastical metal-workers of our day, or, at least, one may say that no one has surpassed them. Richer, more elaborate, more costly productions may have emanated from other houses, but few of equal purity of design, none of greater perfection of workmanship. It is not an ordinary or superficial observation of their works, in contrast to some of the more effective productions of such manufacturers as M. Poussielque-Rusand and Madame Armand-Galliat, which will evidence this. But anyone at all conversant with the principles of metal-work can see it at a glance; and it is by no means artistic to sacrifice the principles to mere gorgeousness of appearance; whilst to adapt a lower method of workmanship to an object for which it is unfitted, just because it is showy and less cosly, betrays, even in an artist, a want of thought and judgment which are inconsistent with the professions he makes.

"Madame Armand-Galliat, of Lyons, *e.g.*, exhibits chalices, which are in appearance rich and elaborate, although not quite satisfactory in proportion, faulty in ornamental detail, and somewhat overdone in design. In fact, it seems ungracious to find fault with things in many respects so meritorious and satisfactory; although I am only doing so by way of contrast. They will not, however, bear contrasting with the chalices of Messrs. Hardman, which, though of simple design, are not only without those faults of proportion and ornamental detail I have alluded to, but partake altogether of a much higher order of art, and are in every respect consistent with, and carry out, the true principles of metal-work.

"The French chalices are almost, if not entirely, cast—those of Messrs. Hardman entirely beaten up. The bowl of the one is surrounded by a casing, unnecessarily thick, not to say clumsy; that of the other, by delicately beaten leaves and flowers of most elegant design; the sharp engraving of the one contrasts unfavourably with the dull stamping of the other, and the uneven polished surface of the excessive enamelling of the French, although possessing the advantage of colour, seems a little wanting in refinement, and of inferior merit to the exquisite finely-wrought gold ornamentation of the English. A chalice too, should be, as far as is consistent with safety, light, and lifted almost without effort. These qualities are the natural result of beaten metal work, whilst the French chalice—I held it in my hand—was unusually heavy. The one, in a word, will bear the minutest inspection; which is a merit scarcely to be conceded to the other. It seems invidious to carry out this comparison any further, or to extend it to the works of other manufacturers; and I have no intention of doing so. I have instituted it from a deep sense of its fairness and lawfulness; and it has confirmed my conviction that however, at first sight, people might be inclined to give the palm to foreign manufacturers, there is not one who, with all his merit, comes up to, or at least excels, our own manufacturers, the Messrs. Hardman, as I have already observed, either for purity of design or perfection of workmanship. To this statement I must make one exception. Mr. Goldie, our own architect, has designed, and Madame Armand-Galliat has executed, a reliquary for a portion of the Holy Cross, which to me seems almost faultless. If Mr. Goldie can design metal-work in such perfection, it shows that he possesses powers of which he has hitherto given us no similar example. This reliquary has a rectangular base, faced with fine enamelling and chasing, and rests on quaint monsters admirably modelled. From the centre of the base gracefully rises a stem with a most superb knob, terminating in a crystal cross, set in finely-wrought gold-work, and surmounted by a gable filled with beautiful foliations, leaves and flowers. On each side of the stem rests an angel in adoration. This inadequate description will not convey any idea of an object which is by far the best of all the foreign similar works in metal. There is no design in Madame Armand-Galliat's cases which equals it, and that is saying much for our English artists."

LIVERPOOL ARCHITECTURAL SOCIETY.

THE 13th meeting of the session of this society was held on the 6th, Mr. F. Horner presiding. Mr. H. H. Vale called attention to the students' competition designs, for which prizes are offered by the society. The subject was a park entrance, for which eight designs had been sent in for competition. The designs, which were exhibited in the room, all bore evidence in a more or less degree of careful study and architectural skill on the part of the competitors. Mr. Vale reviewed in succession the various designs, which, he said, were highly complimentary to the students. He pointed out the respective merits and defects of each, accompanying his criticisms with judicious and timely suggestions for the guidance of the students in connection with their professional pursuits. The successful designs were—1, "Quod potui feci," and 2, "Red Star." The names of the students will be announced and the prizes awarded at a future meeting.—Mr. G. F. Chantrell read a paper (adjourned from the last meeting) on concrete buildings, upon which some discussion followed, and the author was accorded the thanks of the society.

Building Intelligence.

CHURCHES AND CHAPELS.

EXETER. — Southernhay Congregational Church was opened on Wednesday week. The style is Early Decorated, the materials used being Westleigh limestone, with Bath and red sandstone dressings. The church is very broad. It is laid out upon the lines of the nave, north and south aisles, transept, and apse, but the aisle roofs are thrown up to a great comparative height, to secure abundant gallery room, and the clerestory wall is proportionally dwarfish. The clerestory walls are supported by iron pillars bronzed and picked out with colour, with carved stone capitals. The cost of the building was £6214. Mr. Tarring, of London and Torquay, was the architect, and Messrs. Bragg and Dyer, of Paignton, the builders.

HARTLEY WINTNEY.—The Church of S. John the Evangelist, Hartley Wintney, was consecrated on Tuesday week. The church is built in the Gothic style of the Decorated or thirteenth century period. The edifice consists of nave and side aisles, chancel, organ chamber, transepts, baptistry, vestry, foundations for tower, &c., and will accommodate 612 adults and 100 children. The church is built of hard burnt red stock bricks, with Bath stone dressings. The columns in the interior of the church are of Bath stone, the caps carved in foliage, and the walls are plastered in fine sand with slight tint, The roof is open timbered, with principal rafters and ceiling divided by moulded ribs and purlins into panels. The cost of the building has been £3600. Mr. E. A. Lansdowne, of Newport, Monmouthshire, was the architect, and Mr. H. Hibbard, of Bath, the builder.

LIMINGTON, SOMERSET.—The parish church—of which Cardinal Wolsey was once rector—has been reopened, after having its chancel thoroughly restored. The roof is new, and ornamented with carved oak bosses, and the floors are laid with Godwin's tiles. The ancient stall ends are of somewhat late date, but interesting, and have been carefully preserved; they are very elaborately carved; a few new ones have been added. There is a new altar rail of massive design. The reredos is of Bath stone, relieved by marble bosses, and is noticeable as containing excellent carvings of the evangelistic beasts. An ancient picina has been discovered on the south side of the altar. The pulpit stands in its former position, but has been raised, standing upon a base of Ham-hill stone. Some parts of this church exhibit good Early English work, and there are some fine effigies in excellent condition, but, unfortunately, almost wholly blocked from view by high pews. Several Early English coffin-lids, with beautifully-carved foliated crosses upon them, have been found during the restorations. Remains of a fine rood-screen still exist. Mr. Davis, of Langport, has carried out the whole of the works, from designs by Mr. B. Ferrey, F.S.A.

LLANERFYL.—The foundation stone of a new church was laid at Llanerfyl, in the diocese of S. Asaph, recently. The church will consist of nave, with western bell turret, chancel, vestry, and south porch. The fine old open-timbered roof will be repaired and placed over the nave. Room will be provided for 200 persons in open seats. Local stone is being used for the walling, and Shelvoke for the dressings; the chancel fittings are intended to be of oak. The work is being carried out by Mr. W. Morgan, of Llanfair, builder, from the designs of Mr. E. Haycock, jun., architect, Shrewsbury.

STARSTON, NORFOLK.—This church is about to be enlarged and restored, under the direction of Mr. R. M. Phipson, F.S.A. Such timbers of the nave roof as are decayed will be taken out, and others in oak precisely similar in size and mouldings substituted, and the whole re-covered with lead. This roof is figured in Brandon's "Open Timber Roofs." A new north aisle is to be built, with three stone arches and piers opening into nave—the present Decorated windows on the north side of nave being refixed in aisle walls. The roof of this aisle will be in pitch pine, with moulded timbers and tracery spandrels, and covered with lead. An unsightly west gallery will be removed, and the benching will be continued in the aisle in oak similar to that at present in the nave. A new organ chamber at the east end of the new aisle will be erected, and have arches opening both into chancel and aisle. The passages are to be paved with tiles, and Gidney's underground stove used for warming. The contract has been taken by Mr. Grimwood, of Weybread, Suffolk, who has restored several churches in this district, under Mr. Phipson, in a satisfactory manner. The Ven. Archdeacon Hopper, the rector of the parish, has, with his family, contributed the greater portion of the funds.

WORCESTER.—The work of repaving Worcester Cathedral has commenced. The materials to be employed in the Lady Chapel, the aisles, and the two upper transepts are red and yellow Mansfield stone, white Portugal stone, and black marble, from thirteenth century designs. Messrs. Collins and Cullis, of Tewkesbury, are the contractors for the work.

BUILDINGS.

BATH.—A commodious and much-needed goods station has just been completed at Bath by the Midland Railway Company. It is built of blue lias, with Box stone dressings. The roof is supported on a light framework of iron, and has rough thick glass in the centre. The offices are at the east end of the station. Sydenham Field being separated from the city by a river, a bridge is being constructed to form a communication between Seymour-street and the goods station. The bridge will be of cast iron, and in most respects similar to the existing one, with which it will be parallel at a distance of about one hundred yards. It will, however, have no pillars supporting it in the centre. The bridge will have a clear span of 150 feet, while its width will be 24ft. The abutments on the Seymour-street side of the river are now in course of construction. The works are being carried out by Mr. Humphreys, of Derby, and his manager, Mr. Green, from the plans of Messrs. Allport, jun., and Wilson, the engineers, and the architect, Mr. Saunders.

Stoke-upon-Trent. — The showroom at Messrs. Minton and Co.'s works has recently been elegantly redecorated. The style chosen is a free rendering of Greek art, or, rather, a modern translation of that beautiful epoch of decorative art, in which all the spirit of the original is retained, whilst the work has the advantage of being, so to speak, in the vernacular. The walls are painted a deep rich maroon, and have for their sole decoration festoons and pendants of conventionalised foliage. The cornice which surrounds the walls is partially decorated with tiles, and has its mouldings and members judiciously decorated in colour, whilst the deep cove above it is painted of a quiet neutral green drab, relieved by a very beautiful ornament based on Greek tradition, without being a servile imitation. It is painted in blue and crimson. The columns which support the four main arches have their capitals gilt, and are themselves enriched by bands of maroon and gold, relieved by somewhat severe but very effective ornamentation. The pilasters which respond to them on the walls are decorated by an arabesque ornament of simple and tasteful character, and the flat ceiling above the light simply but judiciously treated. Mr. Gee was entrusted by Messrs. Minton with the work.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

Received.—D. H. and J. N.—W. R.—J. F. and Sons—J. M. and Sons—J. J. C. and Co.—Geo. Smith—J. O. S.—C. G. D.—I. L.—Rev. J. A. H.—S. W. and Co.—F. F. M.—J. H.

F. Waghorn.—With sketch of S. Albans.
W. S.—The errors are rectified.

Correspondence.

THE BASIS OF ARCHITECTURAL CLASSIFICATION.

(To the Editor of The Building News.)

Sir,—We are indebted to Dr. Zerffi for pointing out the very remarkable circumstance that the general geometrical character of a nation's habitations is the effect of the same geometrical form ruling in the shape of their heads, and so "giving us the very best basis for classification. The triangular-headed negroes (Prognathi) scarcely go beyond constructing triangular wigwams. The square-headed Turanians (Brachikephali) keep to square houses in the form of tents ; and only the long, or oval-headed Aryans (Dolicokephali) have been capable of combining all geometrical forms for real grand architectural constructions, using the triangle, the square, and the arch." It is possible that captious critics may take exception to both premises and conclusions in this statement ; but enough for us that the hypothesis is sufficiently novel and striking. I declare I think there is a great deal in it, and not merely as regards craniological development but in the varying character of the facial expression. For instance, in the soulless, whimsically-twisted features of the Chinese people, cannot you plainly trace their fantastic bamboo construction, the childishly repeated forms of their pagodas, &c. ? In the straight nose and forehead, and the regular clearly cut features of the beautiful Greek, is there not clearly expressed the character of the national architecture ? Is not the Greek face the Parthenon in human lineaments?

Cannot you see the grand arcuated style of the Romans prognosticated by the finely arched nose and massive visage of that people ? And are not the bold, irregular, but handsome features of the north western nations of Europe typical of their picturesque Gothic styles? It is to be hoped that this important subject will at once engage the careful consideration of Professor Huxley, so that when he secures an indubitable cranium of Prehistoric man he shall be able to tell us what his buildings were. Thoughtfully studying this matter, an important idea seizes me, and I would respectfully submit it as a query to Dr. Zerffi. If an architect is desirous of bringing up some of his offspring to the same pursuit as himself, could he not by a fitting compression of the youngster's skull give it such a shape as will ensure architectural eminence ? It is clear now why we do not excel our forefathers. We are not long-headed enough, though certainly in these days we some of us pull very long faces.

All the important results of this momentous discovery may not at present be evident, but so far they are important, and if the R.I.B.A. have any right or title to be styled Dolicokephali, the next award of their Royal Gold Medal will be to Dr. Zerffi. With sufficient encouragement there is no knowing what interesting and valuable discoveries he will yet make.—I am, Sir, &c.,

Dr. Zerffi's Humble Disciple.

ON THE DORIC STYLE.

Sir,—Dr. Zerffi appears to have been diligently reading up the subject of Grecian Architecture. He however still insists, I see, upon the existence of what he terms the Attic style. Whatever currency Dr. Zerffi's opinions may have with the general public, it would not do to allow his fanciful statements to pass unchallenged in the pages of an architectural journal. The buildings he names in "this well-known Attic style, which is a mixture of Doric simplicity and Ionic elegance, a blending of northern with southern architectural details," are all pure Doric, the buildings in the list contrasting quite as much with each other as they do with other excluded specimens of the style which are not supposed to be "Attic," though on the same soil.

That the Doric style was the invention of the Dorians has no better foundation than the statement of Vitruvius, whose traditions respecting this and the other styles are regarded by English writers as purely mythical. The rock-cut origin of the style is agreeable to the fact that the earliest specimens of the order are much more massive than the later. Had the origin been a wooden construction, it is probable, as Fergusson points out, the reverse of this would be the case. —I am, Sir, &c.,

P. E. M.

RECENT IMPROVEMENTS IN BUILDING APPLIANCES.

Sir,—I should be glad if you will allow me to offer a few practical directions on Mr. Douglass Mathews' paper on this subject reported in your issue of the 1st instant, and I will confine myself strictly to those matters in which I have had actual experience. In concrete walling the only system I have tried has been that introduced by the Broomhall Brick and Tile Company ; it makes capital work when once completed, but my individual experience is that it is excessive in point of cost. The expensive items consisted in waste of blocks, either because they were not true, or that they broke in separating, and generally the labour in trimming, &c. In case of any alterations, or if insertions have to be made in the walls, it is expensive to make good. As a matter of money the 9″ brick fence wall with 14″ piers would have cost 6s. 9½d. per yard, and the 12″ patent wall fair both sides actually cost 21s. 1½d. per yard complete, but it certainly made splendid work.

With regard to bond of hollow walls, any two walls of unequal substance or ultimate load must have a tendency to settle unequally and with consequent tendency to fracture any rigid bond between them. In practice I have found a wrought iron cramp, split and caulked at the ends, and dipped in the centre, to run off water the most simple and most reliable. In the matter of damp-proof course, the Broomhall Company's patent is expensive, that is to say 7d. per foot super, as against 5d. for slate in cement, or 4d. for Wright's tar asphalte, or in that average difference according to quantity or locality.

With reference to fireproof construction I have used Dennett's, Fox & Barrett's, Phillips's, and brick and tile arching, and, taking all things into consideration, have found Dennett's the most convenient and least expensive in execution ; Moreland's is simply an additional means of strengthening Dennett's, and is so far superior for bearing power in warehouses, &c.

The Broomhall tiles make a roof of beautiful appearance, but it is only skin thick, and a cracked or broken tile lets the rain through at once. In case of repairs to chimneys or any inspection of roofs, some are sure to be broken, and they are very troublesome and costly to repair. I have used them in several places ; at a church that I erected I have seen the tiles off by fifty at a time, and this more than once ; the pointing, too, getting loose, with other debris chokes up the gutters and pipes, hence these roofs are a continual source of expense and annoyance.

I had long sought for a good general lock at a fair price, with firmly attached furniture. Hart's reversible bolt is very well, but the instant a lock has to be opened by the joiner for any purpose, as for reversing the bolt in this case, the probabilities are it will get damaged, and each party blames the other. I have largely used Hobbs's locks, to a sample deposited at my office, with their patent spindle, and am not aware of there being a defective one in wear at the present moment.

I am aware that the experience of others may be at variance with mine, but the statements of patentees must be taken with the utmost caution, and it must be borne in mind that the builder must charge something more for his risk in dealing with items of which he knows nothing, and over which his workmen are sure to waste time ; and this again is a further extra upon my quotations.

If the patentee does the work there is always considerable delay, inconvenience of arrangement with parties interested only in one speciality, and hindrance to other trades, and extra cost in consequence, which in one form or another meets the adventurous architect who is tempted to dabble in these matters. If anything goes wrong nobody is responsible, and the blame from all parties falls entirely upon the architect.—I am, Sir, &c.,

Thos. Chas. Sorby.

27, Brunswick-square, W.C.

EXTERNAL FACINGS AND DRESSINGS.

Sir,—The letter from the Architectural Pottery Company, if I understand it rightly, helps to show why bricks with a smoke-resisting surface have not come into general use long ago. Shortly stated, the cause seems to be thus :—architects want a rough glaze, and manufacturers supply a smooth one. Without going so far as Mr. Ruskin, who speaks of lustre as an ignobleness in almost everything, it seems plain that a smooth glazed brick, in jambs and arches for instance, would harmonise very badly with common brick and stone in the rest of the building. Even substances like granite and marble, the beauty of whose veining is a constant temptation to polish them, are generally best in external work when free from actual shininess. Mr. Woodward's Crown Insurance Office, for example, with its facings and dressings all wrought to a uniform degree, looks more of a piece than the Sun Insurance Office, at Charing-cross, with its polished piers and fascias tacked on to a red brick front.

No doubt a smooth glaze gets rather better washed by the rain than a rough one. But that the rain will keep either of them clean no one can imagine for a moment who remembers how dirty our window glass gets in spite of it. We must, therefore, be satisfied with a surface which can be washed either by hand or by engines. A periodical washing, if we had a brick capable of being washed, would soon become as usual as a periodical painting. It is rare now, because with such bricks as we have, it is next to useless. A red or yellow brick with just such a face as the Staffordshire blue ones, if we could only get it, would answer the purpose exactly. But the glaze can hardly be too rough or uneven, both to harmonise with the roughness of the other building materials, and to avoid those reflections which give a jarring speck of light in place of the local colour which the architect meant to introduce. I think any manufacturer who supplies a washable red or yellow brick which has not the drawback of a smooth shiny surface will have no difficulty in finding a good sale for it. It would be quite as useful in exposed towns, like Brighton, as in smoky ones like London.—I am, Sir, &c.,

J. C.

MODERN STAINED GLASS IN GLASGOW CATHEDRAL.

Sir,—In replying to the very offensive article by Mr. Seddon on these windows, I endeavoured to point him out a way by which he might be able to explain the grounds upon which he judges of the qualities of painted glass, and show us by example wherein the Munich glass falls short of these essential qualities ; it is therefore to be regretted that, when in the

cathedral, he did not more carefully examine the windows by our English, Scotch, and other foreign artists or manufacturers. The crypt of our cathedral is the most beautiful part of the building, and one of the finest in the world, and we wonder greatly how it was that an architect visiting our cathedral, and finding himself so much disgusted with the Munich glass in the windows of the church above, did not seek refuge and consolation here below, where but little Munich glass is to be seen.

It would be fruitless to go on contradicting him in his assertions respecting these Munich windows, "that the whole canopy work is a parody of Gothic design, that the colouring of the heraldic portions and borders is crude in the extreme, and that these lead-murdered pictures are utterly out of harmony with the grotesque framework." We submit it is for Mr. Seddon to prove his statements or produce corroborative testimony from recognised authorities on the art

No one will quarrel with Mr. Seddon for holding the opinion "that only English artists should be employed in glass painting," or, that "their work should exhibit appropriate design, good drawing, brilliant and harmonious colouring, and that no shading should be allowed."

England, however, was not the cradle of glass painting, but, on the contrary, she was indebted to the Continent for nearly all the painted windows erected by her in the middle ages, and to the Continent we must still go to study this art in the abundance and perfections of its examples, as Mr. Seddon himself recommends. For published works on this subject we are also still almost entirely dependent on the Continent, and their authors are held in the highest estimation. For these and other reasons, I therefore doubt the wisdom of the advice that "only English artists should be employed," the more especially as he tells us that all our English glass painters, with the exception of one firm, are "mere tradesmen."

"Appropriate designs, good drawing, brilliant and harmonious colouring," appear to us the qualities which most distinguish the Munich windows here, and we think the high reputation of the artists employed will weigh more with those who have not seen these windows than the abusive language indulged in by Mr. Seddon.

In regard to his opinion that "no shading should be allowed," I would remark that, whilst this practice is almost universally disregarded by the glass painters of all countries, and is in opposition to the teaching of our most trusted authorities on the art, he should adopt somewhat milder language when writing about the works of artists who differ from him in this respect. The Glasgow Committee seem to have thought that picture windows on a large scale and composed of groups of figures could not be satisfactorily treated without shading, and in this opinion they were supported by the advice of the late Mr. Winston.

That Mr. Seddon dislikes the Munich windows does not much surprise or annoy me, but that he should adopt such loud, coarse language when writing about the works of brother artists, even though they be Germans, excites my indignation; till he himself sees the rudeness he has been guilty of, apology were fruitless indeed.

The name of a writer can be of little consequence in a discussion where reasons are adduced for the opinions expressed; it is only when opinions are given unsupported by argument, that a good name may give them value, and thinking thus I did not wish my name to appear, as I had no thought of entering on a discussion of the proper treatment of glass paintings, but only to take exception to the unwarrantable assertions and abusive language contained in the article by Mr. Seddon. Having little to fear, and nothing to be even "half ashamed of," I will subscribe myself yours, &c.,

David Thomson, Architect.

"A DISTRICT SURVEYOR AT FAULT."

Sir,—The account you inserted in your issue of April 2nd of certain proceedings taken by the Commissioners of Sewers against Mr. De Keyser, of the Royal Hotel, Chatham-place, in respect of certain works required to be done to his premises to render the same safe, is incorrect in many essential particulars.

Before going into the case I may here mention that the 69th section of the Act of Parliament enacts, "Whenever it is made known to the Commissioners hereinafter named that any structure (including in such expression any building, wall, or other structure, and anything affixed to or projecting from any building, wall, or other structure) is in a dangerous state, such commissioners shall require a survey of such structure to be made by the district surveyor, or by some other competent surveyor, and it shall also be the *duty* of the district surveyor to make known to the said Commissioners any information he may receive with respect to any structure being in such state as aforesaid."

On the 3rd of January last a policeman (and not "or somebody else," as in your report) called here and left word with my clerk that the back wall of No. 10, Chatham-place, was in a dangerous condition. This information I forwarded to the Commissioners in the usual way upon forms supplied by themselves for this purpose, and on the 11th of January I received an order from them to survey and report upon the state of the house in question. On the 17th of the same month I reported that in my opinion a portion of the back wall was in a dangerous state, and recommended certain steps to be taken to secure the same.

Mr. De Keyser, who is one of the Commissioners, seems to have felt himself aggrieved, and complained, through his surveyor, Mr. Gruning, to the Commissioners of my conduct in this matter.

My certificate and report upon the above bears date January 17th, and Mr. De Keyser's complaint through his surveyor is dated February 14th, nearly one month after my report had been sent to the Commissioners; and when I state that up to the former date Mr. De Keyser was an entire stranger to me, it will be seen how groundless is the insinuation that in these proceedings I was actuated by "malicious feelings;" quite the contrary, Mr. De Keyser solicited an interview with me on the 28th January relative to this same certificate, and I then found him to be a very courteous and, as I thought, honourable gentleman; indeed we parted on very friendly terms.

With regard to the question put to me in cross-examination as to whether the wall would stand for "one, two, ten, or twenty years," I declined to answer on the ground that I had nothing to do with the future; the point I had to decide—regard being had to the safety of the public—was, "is or is not this wall now dangerous?" and my opinion is most decidedly that it is dangerous, and ought to be properly secured.

All practical men who are conversant with defective old work know that a structure may stand for an indefinite period, and may on the other hand give way at any moment.

The statement that a "fillet of cement had been run round the house" is simply untrue; the only cement I could discover were a few small bands about 2in. or 3in. long placed at the top of the cracked brickwork; this was, however, at some considerable distance above the crack to which I more particularly referred; and when I say that it is some 12ft. long, and varying from ⅛ to ¼in. wide, running obliquely from north to south, and subject to all the vibration consequent upon the roadway next the house being used for the purpose of conveying heavy loads on to the new embankment, I think you will agree that as the subject was brought before me officially, I could not in the interests of the public have expressed a different opinion than the one contained in my certificate without a grave dereliction of duty, and, in the event of an accident taking place, a judicial censure.

One of the witnesses for the defendant admitted in cross-examination that the wall was to a certain extent dangerous. I was in court during the whole of these proceedings, and have no recollection of the alderman stating that "he thought the case ought to be inquired into elsewhere."

In conclusion allow me to state that my position is thus: Information is left with me that a certain building is dangerous; this is forwarded to the Commissioners, who request me to survey the same, and give an opinion as to its condition, and on this opinion, which is embodied in the form of a certificate, proceedings are taken by them. I am only a witness in the case, and had the Commissioners wished they could have called other professional witnesses to have supported my opinion.—I am, &c.,

Edward Power, District Surveyor.

IGTHAM OR EIGHTHAM?

Sir,—With reference to Mr. Hall's note to you (p. 237) in support of the derivation from a cluster of eight hamlets, the incident of the Oxford and Cambridge boat race enabled me to make a little inquiry. *Chiswick Eyot* was frequently mentioned in the newspapers, and I found it was pronounced Chiswick *Ait*. In Todd's "Johnson" eyot means a little island, and was so used by Blackstone. "It seems just that the eyots or little islands arising in any part of the river shall be the property of him who owneth the piscary and the soil." As to *eight* (Saxon *iggath*, an island) the same dictionary makes it "an island in a river." "Some also do plant osiers on their eights like quicksets."—Evelyn. The situation of the Kentish Mote House (with the waters of a rivulet flowing round the enclosure and supplying the moat) would therefore appear to justify the appellation either of Igtham or Eightham.

12, Regent-street. Thos. Morris.

Intercommunication.

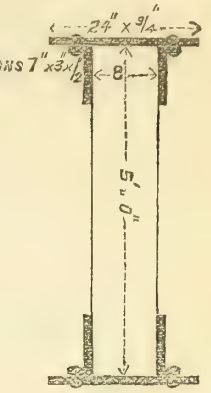
QUESTIONS.

[1827.]—LOCKING DRAWERS.—Will any correspondent inform me how I may construct a nest of drawers (as in the wing of a writing table, for instance), so that I can lock them all with one key at one operation; also what appliances (if any) are necessary, and where to obtain them to effect this object?—H. R. E.

[1828.]—AGREEMENTS AND STAMP DUTIES.—Will any one oblige by informing me how specifications and agreements are made binding with regard to stamp duty? Should the number of folios in both specification and agreement be counted and stamped accordingly for both to become binding? Do agreements and specifications require stamping, however small the amount of the contract?—if not, what amount can a builder's agreement be drawn up for without requiring stamp duty?—B. M., Driffield.

[1829.]—ENGINEERS' EXAMINATIONS.—Would some experienced candidate or any one else give me his idea on the following?—I am to try the engineers' examinations for admittance into the P. W. D. India—whether would I have a better chance after passing a year in a railway engineers' office, or by attending the engineering classes at Edinburgh University for the same time?—Edinburgh.

[1830.]—DEFLECTION OF BEAM.—Will some kind reader inform me how to calculate the deflection of a wrought iron lattice girder to the annexed sketch, 61ft. span and 5ft. deep



under a load of 28 tons at centre, neglecting its own weight? And also required the deflection under its own weight, which is 10 tons?—R. B. L.

[1831.]—HEATING WATER IN BATHS.—Is there not a patent apparatus which if placed into a bath full of water will heat it in a short time? I should be glad to know the manufacturer's address.—A. M. M.

REPLIES.

[1806.]—PRESERVATION OF BRICKS.—"A. B." is quite in error in asserting that our patent process for waterproofing walls alters the appearance "in the same way as a coat of paint would." This is quite a mistake. Perhaps you will kindly allow us to state that no alteration whatever is made in the appearance of walls treated by our process. We shall be pleased to forward "A. B." or any of your readers specimens in proof that our statement is correct. We are manufacturers of a waterproof paint, and the mistake has probably been made of confounding this article with the waterproofing process recently introduced by us, but to which it bears no resemblance, the one being a manufactured article sent out ready for use, the other being a process which can only be executed by our own men with special apparatus devised for the purpose.—R. Gay and Co.

[1817.]—BUILDERS' PRICES.—15 per cent. on the actual cost is considered a fair profit with prompt payment in a new building of a first-class description, but in an ordinary building some of the staple articles, such as bricks, stone and lead, have a somewhat lower per centage put upon them. In reference to cartage of materials, if the quantities are large the price includes the delivery, as they will in most instances be taken direct from the merchant's wharf, but when small quantities are required from the builder's yard, then the cartage is usually charged. In ascertaining the cost it should be understood that the price of labour is the current rate of wages in the district, and of materials the price charged by the wholesale dealer, merchant, or manufacturer, as the case may be, with the cost of carriage added thereto, and the usual allowance for waste if measured net in work. It is very desirable that some clear and recognised rules should be issued by the profession in this matter, as strange blunders are sometimes made. I once heard of a legal arbitrator in a disputed building case deciding that a general builder was entitled to a percentage upon the account for work done by a plumber employed by him to execute that department, in consequence of his not keeping men in that branch of the business, the said account being already charged at the full trade price. Of course no *respectable* surveyor would have been guilty of such an absurdity.—Z.

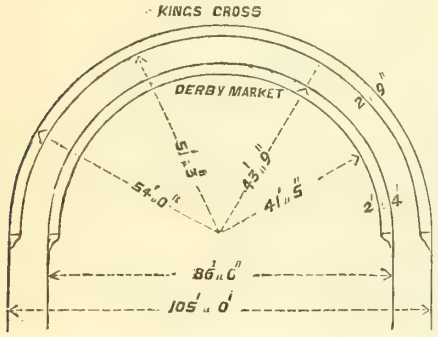
[1818.]—STRENGTH OF IRON GIRDERS.—There are two good practical books by Mr. Shields, which will answer your correspondent's purpose. One is "Strains upon Ironwork," and is devoted to the subject of girders and roofs. The other is "Strength of columns." There is no better work on "Carpentry" than that of Nicholson.—K. S. P.

[1819.]—INTERFERENCE WITH CLERK OF WORKS.—"Pupil" raises an important question; as I take the matter, the clerk of works is the *clerk*, not the *representative*, of the architect on the ground, and his business is to see that the directions and instructions of the architect are fairly carried out with strict limitation of authority, and without any power whatever to pledge the architect or his client. In practice the architect should give all drawings, directions, and instructions to the contractor, who alone is responsible for their execution; and the contractor should deposit such drawings, &c., on the works in the clerk of work's office, whose duty it is to see them carried into execution. The contractor can plead ignorance of any matter of which he has not been officially informed. If the contractor chooses to carry out ideas of the clerk of works in any points not warranted by the instructions before him (the contractor), instead of raising the question for the decision of the architect, as a principle I invariably disallow it if claimed as an extra. I have heard many clerks of works boast of the builders they have ruined, and builders are foolish enough to submit to this, and rather than boldly and honestly stand upon their rights and refer to the architect for decision any question in dispute between themselves and the clerk of works, they blindly go wrong, and involve themselves in miserable consequences.—Thos. Chas. Sorby, 27, Brunswick-square, W.C.

[1820.]—BORING TOOLS.—Being at present engaged in sinking a well in some reclaimed land, I can inform "Vectis," that the simplest boring tools cannot be compressed in a space so small, or reduced to so slight a weight as to be "car-

ried in the hand." An ordinary set of boring tools will go in a long shallow box about 9ft. long by 1ft. square. If all that is required is to ascertain the nature of the subsoil, the simplest and readiest method of doing so is to get a couple of stout "navvies," give them a pick and shovel a piece, and let them dig a "good big hole." With regard to the second part of the question, "Vectis" seems to mix up engineering with agriculture in a very confused manner. There is no single book which treats upon the subjects of foundations, and "the liabilities and capabilities of all sorts of soil." For the former, "Vectis" may consult "Foundations," in Weale's series, and for the latter "Soils, Manures, and Crops," in the same series.—Essex.

[1821.]—ARCHED RIBS.—I am afraid "Pupil" is not quite correct in his measurements. In the accompanying



diagram, I give the outline of the ribs of the two roofs he alludes to. It will be seen from this that the external and internal radii of the King's-cross roof being respectively 54′ 0″ and 51′ 3″. The depth of the rib is not 2′ 0″, as stated by him, but 2′ 9″, and consequently 5″ deeper than that of the Derby Market-hall roof.—The Writer of the Article referred to.

STAINED GLASS.

Marylebone.—The church of St. James's, Marylebone, is in course of restoration, and the Rev. Sir Lionel Darell, Bart., of Fretherne Court, Gloucestershire, has commissioned Mr. George Rogers to execute six stained windows, to be dedicated by Sir Lionel to the memory of his late sister.

STATUES, MEMORIALS, &c.

A colossal figure of Diana robing has just been placed upon the pedestal designed for it between the approaches to the terraces at Streatham Hall, Devon, the palatine residence of Thornton West, Esq. It is in Portland stone, and has been executed by Mr. Harry Hems, of Exeter, an artist of some repute in the West of England.

WATER SUPPLY AND SANITARY MATTERS.

Bolton.—The corporation of Bolton have commenced, under pressure of legal proceedings, the construction of an intercepting sewer 2,300 yards in length, and estimated to cost about £6000, for preventing the pollution of the river. They are now threatened with proceedings by several manufacturers, who are apprehensive that their water rights will be interfered with. The Parliamentary Sub-Committee have visited Leicester and Leamington to inspect the sewage works there, and they presented their report on Saturday. They consider the system adopted at Leicester to be not only inefficient and expensive, but also very offensive. At Leamington the sewage of the town is treated by a company under a patent known as the "A B C" process. Without pledging themselves to any definite opinion as to the efficacy of this system, the committee consider it presents features of possible success, and regarding the difficulty and heavy cost which must be met with in an irrigation scheme for Bolton, they recommend that in the first instance an experiment on a small scale should be made of the "A B C" process, which they say can be accomplished without much delay or a large outlay. This report was adopted by the General Committee, and the Borough Engineer was instructed to submit a scheme for experimental works, with an estimate of their cost. To adopt the irrigation scheme in Bolton, it is believed, would entail an expenditure of at least £60,000, inasmuch as the sewage would have to be pumped to a considerable height, and carried in pipes, for a distance of five miles, to a place called Red Moss, near Horwich. The cost of dealing with the sewage on the "A B C" process is estimated at about £10,000.

Sanitary Legislation in Austria.—A bill for the amendment of the sanitary organisation of the Austrian Empire has been lately under discussion in the House of Deputies in Vienna. The question at issue appears to be whether centralisation of the sanitary department shall or shall not be maintained.

Defects in the Nuisances Removal Acts.—At a recent meeting of the Association of Medical Officers of Health, Dr. Liddle read a paper "On Certain Defects in the Nuisances Removal Acts, with a few Suggestions for their amendment." The drift of the paper was to the effect that, although much good had been effected during the sixteen years in which the Acts had been in operation, there were many shortcomings in them that required amendment. Mr. Liddle especially urged the consolidation of the different Acts into one general Act, to which all sanitary clauses dispersed through other Acts should be transferred. The term "nuisance" ought to be better defined and further extended up to that point at which public opinion had now been educated. The Acts should be made compulsory, and not merely permissive; and the minimum penalty should be fixed by the legislature, so that the magistrates might not have power to make the Acts a dead letter by the insignificance of the penalty inflicted in cases of default. At the close of an exhaustive paper Mr. Liddle embodied his views in a list of suggestions, which it was agreed should be brought under the consideration of the General Purposes Committee, so that they might be brought under the notice of the legislature when a fitting occasion should arise.

Supervision of Sanitary Matters.—At a meeting of the Association of Medical Officers of Health, held on the 19th ultimo, a paper by Mr. Clegg, of Epping, was read, entitled, "A Scheme for the Better Supervision of Sanitary Matters." The scheme was based upon the existing mode of inspection adopted by the Poor Law Board as to areas, and on that in use under the Factory Acts as to powers. The paper was divided into three parts: 1. Officers required; 2. Their duties; 3. A diagram of illustration. The writer proposed the election of a Sanitary Commission in each union, composed jointly of guardians and magistrates. Under the Sanitary Commission there should be a clerk, a medical officer of health, a surveyor, a registrar, a collector, sanitary police officers, and disinfectors. The Government to appoint a medical officer in chief, and 13 district sanitary officers. The *modus operandi* proposed was that the union medical officer should report to the medical officer of health—in the case of epidemics, daily—his reports to be sent in duplicate, so that one might be retained by the medical officer of health, and the other forwarded to the sanitary inspector-general of the district, and from him to the Government medical officer in chief. The duties of various other officers were described in minute detail, as well as the method of proceeding in the execution of sanitary orders when obtained from the magistrates.

LAND AND BUILDING SOCIETIES.

Halifax Permanent Benefit Building Society.—The seventeenth annual meeting of this society was held on the 29th ult. It appeared from the report that the total receipts for the year had amounted to £135,123 11s. 8d., being a larger sum than in any previous year. There had been 961 new members during the year, taking up 2798 shares, being an increase of 30 in members and 386 in shares. The amount paid to withdrawing members had been £19,632 14s. 6d., an excess of £4298 7s. 2d. over the amount paid last year. The number of new depositors was 488, and the receipts from depositors had been £48,208, and the withdrawals £31,187. In the advance department a sum of £76,134 had been granted to members during the year, being an increase of £8,004 over the previous year.

London and Provincial Temperance Halls Company, Limited.—The first annual meeting of this company, formed for the purpose of erecting commodious halls for temperance and educational purposes, was held at the Temperance Institute, Newington Causeway, on the 28th ult., Mr. John Mann, Chairman of the Board, in the chair. The report, which was unanimously adopted, shows the receipts on 675 shares taken up to be £334 14s. 1d., and the expenses, including registration of company, printing, rent, advertising, &c., £77 7s. 5d. A very eligible site has been secured by the directors, on favourable terms, in the Blackfriars-road, on a portion of the site of the old Magdalen Hospital, and on this site the company's first building is proposed to be erected. In selecting the spot named, the directors had in view the erection of a commodious and fit building for the holding of public political and other meetings for the boroughs of Lambeth and Southwark, in addition to serving its ostensible purpose as a temperance hall. At present there is hardly a temperance hall in London that can vie with those to be met with in third-rate provincial towns.

Euston Mutual Benefit Building Society.—The fifth annual meeting of this society was held at its Offices, 12, Red Lion-square, Holborn, on the 23rd ult. From the report presented to the meeting it appeared that the cash at the bankers amounted, at the end of the financial year, to £1016 18s. 9d., of which sum £800 had been appropriated at a premium of £326. During the year two mortgages were completed, the amount advanced being £400 in each case. The report and balance sheet having been unanimously adopted, the directors and auditors for the ensuing year were elected, and the proceedings terminated.

Great Torrington Villa and General Building Company (Limited).—A company bearing this title has been formed at Torrington, Devonshire, having for its object the erection of middle class houses and villas in the town.

Tunbridge Permanent Benefit Building Society.—This society, which was formed some twelve months ago held its first annual general meeting on Thursday week. The report, which showed a balance in favour of the society of £74 14s. 7d., was unanimously approved and adopted by the meeting.

LEGAL.

Benefit Building Societies.—A rule of a benefit building society, enabling its trustees to borrow money to an amount not at any time exceeding two thirds of the amount for the time being secured by mortgages of the society, is not contrary to the provisions of the Act 6 and 7, Will. IV., c. 32. Rules enabling the trustees of such a society to borrow without limit, or to carry on business other than that of a benefit building society, would be illegal, although certified by a barrister under the Friendly Societies' Act. This (says a legal correspondent) was the holding of the Lord Chancellor and Lord Justice Giffard, on the case of Laing v. Reed, being an appeal from a decision of Vice-Chancellor Malins, overruling a demurrer to a bill filed against the trustees of the Northern Counties Permanent Benefit Building Society.

Masters and Workmen.—Williams v. Wilson and Another.—In this case, heard at the Liverpool Spring Assizes on the 29th ult., before Mr. Justice Willes, Thomas Williams, an operative painter, sought to recover damages for injuries sustained by him while in the employ of the defendants, Messrs. Thomas and Henry Wilson, master painters. In October last the plaintiff was engaged, with other of the defendants' workmen, in painting a vessel lying in one of the Birkenhead docks. While the party were working on a scaffold erected by some of the men, it gave way, and plaintiff fell into the hold of the ship. He was severely injured, and it was stated that he would be a cripple for life. At the close of the plaintiff's evidence, his lordship said he considered that no liability could be made out against the defendants. It had been decided that a servant could not bring an action for an accident arising from the negligence of other servants of the same master, unless it was shown that the master was aware of the negligence, which in this case was not proved.—The plaintiff was non-suited.

Stoddart v. Monk.—This case (tried at the Liverpool Spring Assizes on the 28th ult., before Mr. Justice Brett) was an action for work done, materials provided, commission on work which realised a profit of £10,000, and £200 money lent. Both parties are contractors, the plaintiff residing in Belfast, and the defendant living at Seacombe. The former was engaged by the defendant to do work in excavating at the south end of Liverpool. The defence was that he was simply engaged as a walking ganger, and at wages ranging from £2 10s. to £3 per week. During the two-and-a-half years over which the work extended, the plaintiff drew £775. The jury gave a verdict for the defendant.

Sale of Land by Telegram.—The case of Godwin v. Francis was where defendant had held himself out to the plaintiff as having authority to sell an estate, and thereupon a correspondence ensued between the plaintiff and defendant, in the course of which the plaintiff offered to buy the estate for £10,500. In answer to this order the defendant sent the following telegraphic message to plaintiff:—"From B. Francis to Charles Godwin.—Your offer for the estate is accepted. Confirm yours by next post." The defendant had taken the usual course in sending this message, having written it out and signed it, and the telegraph company delivered to the plaintiff a verbatim copy of the message, signed by their clerk. It turned out that the defendant had not the power to sell the estate for £10,500, and the proper owners of the estate repudiated the bargain that had been made. The plaintiff accordingly brought this action against the defendant for his breach of contract. It resulted in a verdict for the plaintiff for £726 9s. On an application to the Court of Common Pleas for leave to enter a non-suit, on the ground that the defendant had not entered into any agreement that was valid within the Statute of Frauds, the court held that the telegraphic message, coupled with the plaintiff's letter, constituted a valid contract within the Statute of Frauds (29 Car. 2, c. 3).—Legal correspondent of *Stockton and Darlington Times*.

Our Office Table.

Ventilation.—The Royal Danish Society of Science, among other prizes, has offered one for the best essay containing an investigation of the movement of the air in a system of ventilation. The essay may be written in English, French, German, Danish, or Swedish, and must be sent in before October, 1870.

The Faraday Memorial.—Mr. Foley has been commissioned to chisel the Faraday monument; so the most unfitting form of memorial is really to be adopted. But the statue, bust, allegorical figure, whatever the work of art may be, is not (says the *Illustrated Midland News*) so out of character as it will be out of place. For where think you it is to be located? In the British Museum, forsooth: an institution that has nothing in common with Faraday's departments of science; that has no gallery of effigiated worthies of any modern period; and that cannot accommodate antique masonry that it already possesses and ought to exhibit. The committee will hardly be able to say that the monument is placed where it will be with the unanimous consent of the subscribers.

Architectural Exhibition Society.—Architects intending to support the Architectural Exhibition this year will probably be glad to learn that the time for sending in drawings has been extended to the 20th instant. We trust the profession will respond to the Society's invitation, and so render the exhibition a really interesting and useful affair.

Institution of Surveyors.—At the Ordinary General Meeting held on Monday, April 4th, the following names were read and passed, to be balloted for on May 9th, viz.:—As member.—Stephen William Williams, Rhayader, Radnorshire. As Associate.—Robert Charles Catling, Needham Hall, Elm, Cambridgshire. The following donation to the library was announced:—"Sir R. C. Hoare's History of Modern Wiltshire," 6 volumes, by F. Attwood. The following donation to the library fund was announced:—W. J. Crawley, £2 2s. A vote of thanks was unanimously passed to the donors, and a special vote to Mr. F. Attwood. The discussion on the paper by Mr. J. Matthews, entitled "A plea for Culture in the Profession of a Surveyor" then ensued; and a vote of thanks was accorded to Mr. Matthews. The next meeting will be held on Monday evening, April the 25th, when a paper will be read by Mr. E. Ryde, in continuance of his paper of last session, entitled "Parochial Assessments." The chair to be taken at eight o'clock. The following candidate will be balloted for, viz.:—As Associate.—George Harvey Elwin, 116, Waterlooroad.

Blackheath Common.—In consequence of a memorial which has been presented by the Inclosure Commission regarding Blackheath Common, the draft of a scheme has been prepared and printed pursuant to the Metropolitan Commons' Act, including the regulations which the Board intends to adopt for the proper preservation of this valuable space. To those interested, we may state that copies of the scheme, maps, &c., may be seen at the Alexandra Rooms, Blackheath, and at the offices of the Greenwich District Board of Works, and that suggestions or objections respecting the schemes will be received by the Inclosure Commissioners.

Chips.

A new chief post-office is about to be erected in Queen-street, Wolverhampton.

The late Mr. John Meeson Parsons, formerly of Raymond-buildings, London, has bequeathed to the nation one hundred pictures, to be selected from the well-known valuable and choice collection which he made during his lifetime. In addition to this he has directed that the South Kensington Museum shall be placed in possession of a number of valuable water colours.

A number of public improvements are being carried out at Saltburn-on-the-Sea.

Worcester has refused to adopt the Free Libraries Act.

We regret to hear that Mr. Henry Sharp, the esteemed treasurer of the Builders' Clerks' Benevolent Institution, committed suicide on Friday morning last, at his residence at Croydon. For a long time past he has been in a desponding state of mind; in fact, he never recovered from the stoppage of Messrs. Piper and Co., by whom he had been for many years engaged.

TIMBER TRADE REVIEW.

ON THE EXPEDIENCY OF BUYING AND SELLING PLANKS, DEALS, AND BATTENS, ETC., BY ONE UNIFORM STANDARD OF 120 12 FEET, 1½ BY 11, OR ST. PETERSBURG STANDARD.

This is a question of very great importance to all consumers of wood, and is also of interest to all mechanics whose calling it is to use such materials. At present there are so many various ways of buying manufactured timber that endless confusion is the natural result. During an experience of twenty-five years, the writer has bought and sold by the St. Petersburg standard of 120 12 ft. 1½ by 11; per 120 12 ft. 3 by 9, 3 by 7, 2½ by 7, 2¼ by 6½, &c., per foot run, and per 100 superficial feet of 1 inch, and each system probably has its supporters. In old times, when there was less competition, such a state of things did not result in much inconvenience, for a consumer in the country and his timber merchant most likely dealt with each other all their lives, were used to each other's methods, and would have resented the idea of change. All this is altered now. Railways and penny postage are continually bringing offers of wood either by letter or by traveller, and the different systems are thus brought into puzzling juxtaposition.

It being quite impossible to carry all the different relative prices in the memory, a book of reference containing such calculations is an absolute necessity, whereas if the Petersburg standard were universally adopted to the exclusion of all others, such books could almost be dispensed with. They would be useful so far as they showed the price per foot run at any rate per Petersburg standard, but for little more.

It is quite possible for an ingenious traveller who thoroughly understands his business to get a better price for his goods by quoting at a rate per standard which his customer is not quite master of. For instance, he asks £7 per Petersburg standard for a parcel of 2½ by 7 battens. His customer, who is used to this method of buying, demurs, and thinks the price high, and the traveller shifts his ground and asks £7 10s. per 120 12 ft., 2½ by 7, and effects a sale, although he is giving £7 1s. 5d. per Petersburg standard for the same goods he declined at £7. This is not a problematical case, but one which occurred to the writer's own knowledge not three weeks ago. Of course the same tactics can be resorted to by the buyer, but the incident shows that it would be much fairer to adopt one uniform standard. Again, if the market price be £7 15s., Petersburg standard, and the consumer requires a price for 120, 12 ft. 3 by 9, the merchant will not quote £12 13s. 8d., which is the exact equivalent for £7 15s. Most likely he will ask £13 for 3 by 9, which is 3s. 11d. per Petersburg standard more than it should be. Again, if £8 per Petersburg standard is the price for 2½ by 6½ battens, he will no doubt charge £8 for 120, 2 ft. 2½ by 6½, or equal to £8 2s. 6d. Petersburg, thus causing a loss of profit to the consumer of 2s. 6d. per standard of 120, 12 ft. 1½ by 11. These are not paltry considerations in this age of competition. Such amounts constantly recurring make serious difference to large buyers, and are not to be despised by small ones. There can be no doubt that importers would gladly meet the views of consumers in this respect, provided a proper representation were made to them. It would be the means of simplifying their accounts, and saving much valuable time. The question of calliper and string measure is now being ventilated, so that a more favourable opportunity cannot occur for settling this question at the same time. It is not here proposed to abolish the practice of buying and selling by the foot run. Such a course would not meet with the approval of any one, for it would be manifestly absurd to expect a carpenter, for instance, in a small way of business to buy a few planks, &c., at a rate per standard. Such persons almost invariably buy by the foot run, and would buy in no other way.

A traveller once had the curiosity to keep an account of the advantages he obtained in 12 months, by ringing the changes on the various standards in the manner already described, and the extra profit to his employers amounted to over £300. On the other hand, it is quite possible that he did not deduct the instances of the consumer getting the advantage over him. But, at any rate, the fact proves that an alteration is desirable, and that such alteration would save much labour, and commends itself by its fairness and simplicity.

LATEST PRICES OF MATERIALS USED IN CONSTRUCTION.

Timber.

	£ s.	£ s.
Teak ..... load	12 0	12 10
Quebec, red pine	3 15	4 15
,, yellow pine..	4 0	5 0
St. John, N.B. yellow	0 0	0 0
Quebec oak	5 15	6 5
,, birch	3 15	4 15
,, elm	4 5	5 5
Dantzic oak	4 5	6 5
,, fir	2 5	4 0
Memel fir.....	2 5	3 10
Riga	2 15	3 5
Swedish	2 0	2 13
Masts, Queb. red pine	3 10	6 0
,, yellow pine ..	4 5	6 0
Lathwood, Dant. fm.	4 0	6 0
,, St P'burg.	6 0	6 10
Deals, pr C., 12ft by 3 by 9 in.		
Quebec, white spruce	12 0	17 10
St. John, white spruce	12 0	15 0
Yellow pine, per reduced C.		
Canada, 1st quality..	18 0	19 0
2nd do.....	12 0	13 0
Archangel, yellow ..	11 0	12 10
St. Petersburg, yel...	11 0	12 0
Finland	6 10	8 0
Memel	7 0	9 0
Gothenburg, yellow	8 0	8 10
,, white ..	0 0	0 0
Gefle, yellow	9 0	10 10
Soderham	8 0	9 10
Christiania, per C., 12 ft. by 3 by 9 in yellow	10 0	12 10
Flooring Boards, per sq. of lin., first yel.	7 6	10 0
First white.....	7 0	9 6
Second qualities	6 0	7 0
Pumice Stone pr tn	6 0	8 0
Oils, &c.		
Seal, pale .. per tun	43 0	0 0
Sperm body.....	92 10	0 0
Cod.....	40 10	41 0
Whale, Sth Sea, pale	39 0	40 0
Olive, Gallipoli.....	57 0	0 0
Cocoanut, Cochin, tun	45 10	46 0
Palm, fine	40 10	0 0
Linseed.....	32 10	0 0
Rapeseed, Eng. pale..	44 10	0 0
Cottonseed	31 0	36 0

Metals.

Lead:—

Pig, Foreign	per ton	18	5	0	0	0 0
,, English, W.B.	do.	19	7	6	0	0 0
,, Lead Co.	do.	19	0	0	19	5 0
,, Other brands	do.	18	10	0	18	7 6
Sheet Milled	do.	19	5	0	19	10 0
Shot, Patent	do.	22	0	0	0	0 0
Red or minium	do.	20	0	0	0	0 0
Litharge, WB	do.	0	0	0	0	0 0
White dry	do.	26	0	0	28	0 0
,, ground in oil	do.	26	0	0	29	0 0

Copper:—

British—cake and ingot	per ton	69	0	0	69	10 0
Best Selected	do.	71	0	0	71	10 0
Sheet	do.	74	0	0	75	0 0
Bottoms	do.	78	0	0	0	0 0
Australian	do.	71	0	0	74	10 0
Spanish Cake	cash	0	0	0	0	0 0
Chili Bars	,,	66	0	0	66	10 0
,, refined ingot		69	10	0	72	0 0
Yel. Metal Sheathing & Rods	per lb.	0	0	6½	0	0 6¾

Trade News

TENDERS.

Bristol.—For making 17,400 superficial yards of roads, &c., at Stoke Park, near Bristol:—

Adams and Kirby.....	£2800	0 0
Pilditch and Sons.....	2207	16 2
Price	1992	2 6
C. and S. Rogers	1898	13 0
Storkey	1824	0 0
Mullett (informal)	1735	0 0
Merewether and Son	1630	0 0
Davies	1541	3 0
Baker (accepted)	1521	0 0
Sidwell (informal).....	1504	10 3

Hampstead.—For repairs, &c., Belsize House, Hampstead. Mr. Horace A. Alexander, architect:—

Waterer	£910 0
Colls and Sons	870 0
Barratt	772 19
Mansbridge (accepted)	720 0

Farnham, Surrey.—For the erection of additions, &c., and alterations to the Farnham and Haitley Wintney District Schools. Mr. Edmund Woodthorpe, architect. Quantities supplied by Messrs. Welch and Atkinson:—

Hill, Keddell, and Waldram.....	£4225	0 0
Brinton and Bone	4100	0 0
Cooper and Co.....	4080	0 0
Martin, Wells, and Co.	3993	0 0
Nightingale	3823	0 0
Bull and Son	3783	0 0
Perry, Bros.	3747	0 0
Strodley and Kemp	3700	0 0
Bowker	3679	0 0
Harris, jun.	3621	16 4
Goddard and Son.	3595	0 0
Birch (accepted)	3480	0 0
Duke	3200	0 0
Architect's estimate.....	3640	0 0

Hull.—For a Working Man's Art, Industrial, and General Exhibition building, Hull, Yorks.; with allowance for taking back the old materials after the building is done with. R. G. Smith, Esq., architect. Quantities supplied by Mr. G. W. Ranwell:—

Marshall.....	£2750	Allowance...	£400
Fewster	2736	,,	500
Skinner	2454	,,	790
Habbershaw	2267	,,	450
Jackson	2255		
Hutchinson	2252	,,	500
Bray and Dixon	2194	,,	500
Hall	2149		
Do. amended.....	1945		
Bewers	2030		
Hall (accepted)	1990	,,	550

Kensington.—For building premises in High-street, Kensington, for Mr. Wickham. Mr. Josiah Houle, architect. Quantities by Mr. D. Cubitt Nichols:—

Patman and Fotheringham	£3025
Temple and Foster	2945
Ennor.....	2920
Macey.....	2892
Chamberlain, Bros.....	2863
Stimpson	2794
Cowland.....	2750
Axford and Whillier	2698
Hockly	2658
Langmead and Way	2634
Scrivener and White	2512

Kensington.—For building two houses and shops in High-street, Kensington, for James Broadbridge, Esq. Mr. Josiah Houle, architect. Quantities by Mr. D. Cubitt Nichols:—

Ennor.....	£2498
Temple and Foster	2486
Macey	2440
Chamberlain, Bros.....	2399
Langmead and Way	2397
Stimpson	2393
Cowland	2350
Axford and Whillier	2330
Scrivener and White	2288

London.—For the erection of the West London District Schools at Ashford, Middlesex. Mr. H. H. Collins, architect. Quantities supplied by Messrs. Batstone and Hunt, and Mr. Gritten:—

Merritt and Ashby	£57,965
Brass	55,990
Newmann and Mann	54,728
Crockett	52,300
Jackson and Shaw	52,300
Tongue	52,250
Nutt and Co.	52,000
Myers and Sons	51,961
Crabb and Vaughan	51,600
Capps and Ritso	51,126
Hart	50,500
Gibson, Bros	49,908
Perry and Co.	49,770
Henshaw	49,350
Howard	48,969
Ebbs and Sons	48,866
Hill, Keddell, and Waldron.....	48,500
Kilby	48,435
Marwick and Thurgood.....	47,479
Kirk	46,994
Harris.....	46,500
Fergusson	44,670
Kelly Bros.	43,600
Bull and Sons, Southampton (accepted)	43,590

London.—For works for Mr. Chick, Princes-street Leicester-square. Mr. Thacker, surveyor:—

Pulsford	£516 0	2nd contract.....	£127 0
Barnard	450 15	,, ...	110 15
Norris and Son	450 0	,, ...	95 11
Hookham	333 0	,, ...	85 0

Norfolk.—For enlarging and restoring Starston Church, exclusive of the old materials. Mr. R. M. Phipson, F.S.A., architect:—

Grimwood (accepted)	£725

Settle and Carlisle Railway.—The last length of the Midland Railway Company's new line from Settle to Carlisle was let on Tuesday last, 5th April. The tenders were by invitation, and five were sent in. When they were opened they disclosed the following offers:—

Eckersley and Baylis	£329,905
Firbank.....	357,000
Nelson and Co.	367,000
Woodiwiss and Benton	370,000
Brassey.....	420,000

The contract was consequently let to Messrs. Eckersley and Baylis. The length of the section contracted for is about 24 miles, extending from Newbiggin to Carlisle.

Somerset.—For the restoration of Worle Church. Mr. John Norton, architect:—

Young.....	£1620
Date	1600
Hughes	1560
Wilkins and Son	1400
King	1393
Stephens	1344
Beaven and Sons.....	1324
Hunt	1310
Newton	1262
Gorvett	1240
Wall and Hook.....	1230
Diment	1135
Bennett	1124
Bale	875

Westbourne Park.—For paving and carriage-way in part of S. Ewan's-road, and Aclam-road, Westbourne Park Estate, for the Land and House Investment Society, Limited. Mr. Josiah Houle, surveyor:—

Howlett	£1333 0
George	1260 10
Horsman	1225 0
Nowell and Robson	1210 0
Crockett	1203 0
Hayden	1200 0

Westbourne Park.—For building the vaults in part of S. Ewan's-road, and Aclam-road, Westbourne Park Estate, for the Land and House Investment Society, Limited. Mr. Josiah Houle, surveyor.

Crockett	£649
Roberts, Bros.	646
Ireland	619
Howlett	544
Blight and Baron	463

Wetheral, Cumberland.—For the erection of a house for John Scott, Esq. Henry Jarvis and Son, architects:—

Milburn	£3168 9
Court	3135 10
Armstrong	3059 0
Black	2835 0
Nelson and Cockburn	2813 0

Yoxford.—For alterations and additions to the Grove, Yoxford. Mr. R. M. Phipson, F.S.A., architect:—

Mountain and Cotton	£1339 0 0
Grimwood	1246 11 0
Smyth and Sons (accepted)	899 7 6

COMPETITION.

Bradford Abattoir Company Limited.—Extension of time to 2nd May.—Plans, &c., of a slaughter-house, cattle sheds, and all necessary appurtenances to a slaughter-house proposed to be built at Bolton Bridge; also plans for an hotel and outbuildings, adjoining to Bolton-road, and near to the proposed slaughter-house. The directors will give £20 for the best, and £10 for the second best set of plans. Messrs. Dixon and Hindle, Land Agents, &c., Kirkgate, Bradford.

Manchester, May 30.—For abattoirs and a carcase market. The following premiums will be awarded:—One of £150, one of £100, and one of £75. Joseph Heron, Town Clerk, Town Hall, Manchester.

CONTRACTS OPEN FOR BUILDING ESTIMATES.

Sittingbourne Waterworks, April 18.—Contract No. 1.—For erecting an engine and boiler house and other works at Keycoll-hill, near Sittingbourne. Contract No. 2.—The supply and erection of a steam engine, boiler, feed pumps, and gear. Contract No. 3.—To supply and fix a set of three-throw pumps, on the vertical principle. W. J. Harris, Clerk to the said Committee, Sittingbourne.

Cambridge, May 6.—For the erection of a corn exchange, in Wheeler-street and Corn Exchange-street. Edmond Foster, town clerk, Cambridge.

Barrow-in-Furness, April 18.—For the erection and completion of a steam corn mill. William Thomas Manclarke, secretary, Barrow-in-Furness.

Kingston-upon-Hull Local Board of Health, April 21.—For the construction of about 2500 yards in length of brick sewers, and other works. C. S. Todd, clerk to the board, Hull.

Evesham, May 2.—For the restoration of S. Mary's Church, Chelmswickham. Rev. J. Hartley, Chelmswickham, near Broadway.

Halifax, April 30.—For the erection of a Unitarian chapel. Mr. William Bakewell, architect, 12, East-parade, Leeds.

Doncaster, April 27.—For the erection of a corn exchange, also carpenter's, joiner's, plasterer's, glazier's, and other works connected. Mr W. Watkins, architect, Lincoln.

Doncaster, April 27.—For the ironwork required for the roof of the new corn exchange and the roof of the vegetable market and works in connection therewith. Mr. W. Watkins, architect, Lincoln.

Salford, April 19.—For alterations to the Salford Town Hall. George Brett, Town Clerk.

Canterbury, April 18.—For erection of a new malt kiln store and additions to malthouse. Mr. John Green Hall, architect, 8, S. Margaret's-street, Canterbury.

Metropolitan Board of Works, May 3.—For the supply of materials, cartage, supply of men, horses, and carts, and slopping and cleansing of roads. Metropolis Roads Office, 32, Craven-street, Strand.

London and North-Western Railway, April 19.—For construction of the Dowlais Extension Railway from London and North-Western and Rhymney Company's joint line, in Brecon county, to Brecon and Merthyr Railway in Glamorganshire, length about three miles. Mr. John Gardner, C.E., 9, Victoria Chambers, Westminster, S.W.

Bournemouth, May 2.—For execution of town sewer works. C. C. Creeke, Esq., surveyor, at the office, Bournemouth.

St. Giles's, Camberwell, April 25.—For repairing Ann-street and Carlton-road, also kerbing and paving the same. G. W. Marsden, Vestry Clerk, Vestry Hall, Camberwell.

Brighton, April 19.—For making and supplying ironwork and fittings, weighing about 70 tons, in connection with main sewers. P. E Lockwood, Borough Surveyor, Town-hall, Brighton.

Exmouth Local Board of Health, April 19.—For supply and fixing of 770ft. of ornamental cast-iron railing 3ft. high, and 3 gates. For supplying and building 770ft. brick and Portland stone walling 2ft. 6in. high, and 6 brick and Portland stone gate pillars. Mr. P. Sherwin, Surveyor to Local Board.

BATH STONE OF BEST QUALITY.

Randell, Saunders, and Company, Limited, Quarrymen and Stone Merchants, Bath. List of Prices at the Quarries and Depôts; also Cost for Transit to any part of the United Kingdom, furnished on application to

BATH STONE OFFICE,
[Advt.] Corsham, Wilts.

BANKRUPTS.

Act 1869.—To surrender in London.

William Kerridge, George-street, Notting-dale, builder, April 28, at 12—John Sergeant, Golborne-road, Notting-hill, builder, April 26, at 12.

To surrender in the country.

Richard Kimpton, Sheffield, builder, April 22, at 1—James Huntley, Horsmonden and Tunbridge Wells, builder, April 25, at 3—Samuel Ikin, Bolton, builder, April 20, at 10—William Winstanley and John Formby, Liverpool, engineers, April 26, at 2.

Act 1869.—Public examinations.

A. Baker, Aclam-road, Portobello-road, builder, May 5—F. Kidds, Saltburn, builder, April 26.

Sittings for last examination.—Act 1861.

G. Eccles, Hull, joiner, April 22.

Dividend meetings.

C. Hucker, Slough, timber and coal merchant, May 11—J. and R. Potter, Liverpool, builders, April 22—F. Drake, Acton, house decorator, May 4—G. Hewett, Mile-end-road, builder, May 4—W. H. Gardiner, Mitcham, builder, May 4—J. Thurlow, Meopham, Kent, builder, May 4—A. Marriott, St. Neot's, gas and hot water engineer, May 4.

Scotch sequestrations.

James S. Scott, Glasgow, house painter, April 13, at 12—James Muir, Edinburgh, builder, April 18, at 2.

PARTNERSHIPS DISSOLVED.

Wheatley and Mellor, Yeadon, Leeds, engineers—Harrand and Heptonstall, Batley, carpenters—Taylor and Edmondson, Horton, joiners — Athorn and Tattersall, Chorlton-upon-Medlock, plumbers and glaziers—Sweetser and Wadman, Essex-road, Islington, engineers—Lumb and Worth, Stockton-on-Tees, engineers — Parker and Hunt, Holbeck, plumbers and glaziers—Brownsworth and Co., Birkenhead, plumbers and glaziers.

Holborn Viaduct. — Eligible business premises to be let.—The Improvement committee of the Corporation of London will meet at Guildhall, on Monday, the 16th May, 1870, at 2 o'clock precisely, to receive PROPOSALS in writing for taking, upon leases for 21 years, the HOUSES ERECTED at the North-West, South-West, and South-East angles of the Farringdon-street Bridge. The houses can be inspected between the hours of 9 and 6 daily, upon application to the housekeeper. The committee do not bind themselves to accept the highest or any tender Parties tendering are required to attend. Further particulars can be had on application at the Architect's Office, Guildhall.

WOODTHORPE.

Guildhall, April 13th, 1870.

Kew. — Important Building Estate. The Cumberland Estate, adjoining the Royal Gardens, and close to the Kew Gardens Station, with new roads formed through the estate, offering choice Building Sites, To BE LET, on Building Leases, direct from the Freeholder, at moderate ground rents. The soil is loam, with a subsoil of sand and gravel, and the climate is proverbially healthy. Water is laid on. By the new railway in connexion with the Metropolitan system, Kew is now readily accessible from all parts of the metropolis. Money will be advanced. Plans and particulars may be had of Messrs. DRIVER, Surveyors, Land Agents, and Auctioneers, 4, Whitehall, London, S.W.

Sites for One or Two Public Institutions or Large Buildings.—To be SOLD, with immediate possession, 16 ACRES of FREEHOLD WELL-TIMBERED OLD PARK at WATFORD, HERTS, five minutes' walk from the station, abutting on the high road, with good sewers, water and gas, dry gravel soil, and chalk subsoil.—Particulars of Messrs. R. S. Taylor and Son, 4, Field-court, Gray's-inn, or Messrs. Humbert and Cox, Land Agents, Watford, Herts, and 88, St. James's-street, S.W.

John Gosnell and Co.'s Cherry TOOTH PASTE is greatly superior to any tooth powder, gives the teeth a pearl-like whiteness, protects the enamel from decay, and imparts a pleasing fragrance to the breath.

Angel-passage, 93, Upper Thames-street, London.

Mr. H. C. Bunkell has applications for all kinds of Securities and Investments. Notices of Estates, Land or Houses to be Let or Sold are inserted in his monthly register, and extensively circulated free of charge. Commission (only upon business effected) fixed and moderate. Applications and particulars are requested to be forwarded to his Auction, Land and Estate Offices, 30, King-street, Cheapside, E.C.

Pure Water.—The latest patented Cistern Filter in general use is the SELF-CLEANING CHARCOAL CISTERN FILTER, a great improvement; filed in July last by FREDERICK LIPSCOMBE and CO., Temple Bar, who are fixing more filters into cisterns than all other filter makers put together. Prospectus free.

Wanted to purchase, a second-hand corrugated iron building about 50ft. by 20, if to be soldcheap. —Address, with price and particulars, accompanied with rough sketch, to Mr. J. A. Wilkins, Builder, Oxford-road, Windsor.

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THE BUILDING NEWS.

LONDON, FRIDAY, APRIL 22, 1870.

DESIGN IN SHOP FRONTS.

A SHOP front must always necessarily prove a very tough architectural subject—so tough, indeed, that numbers of architects are content to leave it alone altogether. An exceedingly common practice is to throw a strong bressummer across the whole front of a new building at the height of the first story, and merely propping it up with one or two thin iron pillars, leave a gaping chasm below, which the shopkeeper may afterwards fill up at his pleasure with any deformity his own want of taste, or that of the mechanic he employs, may dictate. The upper part of a house, which in ordinary streets comes least into view, will thus often give tokens of having been designed with a knowledge of the rules of architecture, while the lower portion—the shop, which is the most prominent feature, and is capable of giving picturesqueness and completeness to the whole—will consist either of the gaping chasm aforesaid, enclosed but not concealed with plate glass, or of some pattern selected from the stores of a manufacturer, entirely out of keeping with the elevation of the house front above. There are two main reasons for this. The first is the deficient taste of the shopkeeper, and the other the neglect of the profession to study so common place a subject.

As to the taste of the shopkeeper, he believes in unlimited plate glass, or if he cannot satisfy himself in that respect, he seeks the most staring pattern he can get, to distinguish him from his neighbours. As to plate glass, he counts the inches with as much eagerness as a farmer does his acres of land, and thinks they are productive in much the same manner. His rent is regulated to a very large extent by the length of his frontage, and he naturally thinks it to his advantage to utilise every possible inch of it for the display of his goods. He therefore votes every pier which supports the superstructure an obstruction and a nuisance, every pillar must be as thin as possible, and be put as far as it can out of sight, and the whole upper part of the building, as far as appearances go, must either hang unsupported in mid air, or threaten to prove too heavy some day for the thin weak columns and insufficient piers.

These remarks apply, we must confess, principally to second-rate shops, and to frontages of small extent. When shops are built upon a large scale in commanding positions, and where the upper floors are used, as well as the lower, for the display of goods, it very often happens that an architect of some skill and reputation is employed, and then, of course, the whole elevation of the building, including the shop front, is entrusted to him; the larger scale on which he is able to work affords him some scope for carrying out his ideas, and the result is that we get a fair average of successes. The smaller shops, however, occupy collectively a much larger extent, and in the great variety of treatment which can be admitted, afford a very wide field for the exercise of skill. That they should be left to the undirected taste of the shopkeeper or the mere carpenter we believe to be a waste of every-day opportunities, which numbers of men profess only to want, and upon which it must be said the architectural profession is more dependent, perhaps, than any other. Besides the inherent difficulty of the subject, we fear that another cause of its neglect must be considered that common infirmity of our human nature, the desire to do something grand and striking, to the neglect of that which is homely and commonplace. We could get thousands of designs to order any day for cathedrals, churches, townhalls, palaces, and mansions, but in domestic and street architecture, just the subjects in which variety is most possible and most picturesque, we find the greatest paucity of ideas, and the most inconsiderable number of varieties. We believe, however, after all, the main reason why we have so few artistic shop fronts is to be found in the many contrarieties which have to be reconciled in them. The shopkeeper requires his gaping chasm and his plate glass. He is firmly convinced that the open space serves his purpose best, and when he yields a little on this point he insists on as much meretricious and gaudy ornament as possible, to attract customers. His experience has taught him that customers are attracted by such means, and until the general public are more widely imbued with an appreciation of true art principles the gaudy and flimsy will continue to be attractive. Thus we come round in this matter, as we do in every other branch of inquiry respecting the non-progress of art, to the conclusion that its ultimate cause is to be found in the want of a general diffusion among the masses of the people of the faculty to appreciate the true and beautiful. The few who have studied deeply, and whose training and profession qualify them to guide, are driven, in such every-day matters, to become slaves of the lamp, and to follow where they should lead.

> Artistic laws the artists' patrons give,
> And they who live to please must please to live.

Thus our street architecture progresses far too slowly, and where we do not find a dull uniformity we are frequently afflicted with a medley of incongruous and unpicturesque notions worthy only of *une nation boutiquière*.

It is well, however, that artists should not altogether resign their proper function, which is to invent forms combining all that is useful and beautiful, so as to challenge and obtain a preference over inferior productions, and to educate the public taste to a degree hitherto unattained. The exigencies of trade did not require large shop fronts in Classical or Mediæval times. If they had been required, the ancient architects would doubtless have found a way to reconcile the opposing requirements of utility and æsthetics, and have left us precedents we might copy with as much satisfaction as most of their other small works, such as gateways, altars, tombs, chests, &c. The shop front is an artistic problem peculiar to the nineteenth century, and its solution can be found only by a general reference to well-defined principles and their bearing upon the peculiar requirements of the case.

In the first place, we think the practice of designing the upper part of the building only, and leaving the shop to be dealt with as an afterthought, is one that should never be adopted where it can be avoided. The shop is really the most important feature in the elevation, as it is the most valuable, and the upper parts should be subsidiary to it. Whatever style be adopted for the shop-front should be carried throughout, and the features of lightness and airiness should be in accordance with its general character.

Next, as to the lines of construction. The superstructure may be supported either upon arches or a bressummer. The former arrangement was often adopted in the mediæval shop fronts, of which some excellent examples are to be seen in M. Viollet-le-Duc's "Dictionnaire de l'Architecture Française." (Article, "Boutique." These shops were, however, as noted above, very inconsiderable compared to those of modern times, and were, besides, entirely open to the street, being closed at night by wooden shutters, which were propped up by irons during the hours of business, and served in their upper portion for a canopy, and in their lower for a stall-board. The arch construction labours under the disadvantage of requiring strong abutments to convey the weight, and these will occupy a greater portion of the space than can be allotted by the tradesman. An instance of this may be seen in some shops which are otherwise very excellently designed, now building and partly completed, in Villiers-street, Strand. The whole frontage of the building is of brick, strong piers being carried up to sustain a depressed circular brick arch spanning nearly the whole width, which supports the upper stories. A plain beam is placed across the span at the spring of the arch, and the space in the head is filled up with an ornamental design. These shops have the rare merit of being perfectly truthful, and the result is very fair, but we fear the tradesman will wish some of the space occupied by piers had been left for his window. The pointed arch can very seldom be used effectively for a shop front, and should only be attempted where some forcible reason exists, such as the juxtaposition of any important buildings in the same style. We engraved, last year, the design of a shop front in New York, which consisted of an arch in the later decorated style of Gothic, of the height of three stories. It gave one an idea of the western door of a cathedral, and, not to mention the solecism of such an enormous arch without any corresponding structure above, it appeared singularly inappropriate for a depôt of sewing machines. Mr. Gilbert Scott's shops adjoining the new Midland Railway Station, S. Pancras, have pointed arches in accordance with the general style of the building, and are well worthy of notice. He has made the head of the arch a very effective feature by introducing a simple pattern at the intersection of the sash bars with each other. As a general rule, the arch, if pointed at all, should be a depressed one, after the late Tudor pattern. A greater height will interfere too much with the stories above, and will need buttresses, which the space cannot afford.

In very wide spans, however, it is evident that a depressed arch must approach too nearly to a straight line to be effective, and we must then use more than one arch, so as to form an arcade, or adopt the bressummer. When more than one arch is used, the general treatment may be much less heavy below, and great scope is afforded for ornament above. The columns supporting the arches should not, however, be put out of sight behind the plate glass, but be brought out to the front and show themselves. Some really good shops of this class may be seen in Throgmorton-street. The plate glass is placed in a recess, and the central columns stand in front, their position being made to coincide with the line of the sash bars. A tradesman accustomed to the prevailing notion of keeping the plate glass front entirely clear might object at first to such an arrangement, but an inspection will convince him that a front of this kind offers quite as little interruption to a view of the window and its contents as the common sash bars. A column of 6in. in diameter placed in front of a recessed window in this manner will, in fact, interrupt the view rather less than two sash bars of 1½in. each. The common practice of bringing out the glass to the extreme limit allowed by the Building Acts is not always the most effectual. Great advantages might be obtained if the practice of recessing the window were more frequently adopted, more especially in confined situations. The recess gives opportunities of display equal to those obtained by any other method, and offers, besides, a special attraction in the nature of a shelter from passing crowds, or from bad weather, which induces spectators to linger. The shopkeeper may thus find advantages to compensate him for the small sacrifice of interior space, and for permitting the use of a design which gives increased scope for truthful construction and artistic effect. A recessed window, in the most crowded situation, probably, in London, near the Cornhill corner of Gracechurch-street, in the City, affords an illustration of this fact. The situation is one of the most confined possible; and yet crowds are to be seen at all hours, leisurely examining its contents, without

discomfort to themselves or interruption to the enormous stream of passing traffic. They are attracted partly by the paintings and fine chromos exhibited within, but in quite an equal degree by the comfort and security afforded by the recessed window. The idea of thus recessing the windows is, perhaps, one of the happiest that has been introduced into the subject, and deserves to be much more extensively worked for both æsthetic and utilitarian reasons. Another example may be seen at a stationer and bookseller's shop in the Bishopsgate-street portion of the same thoroughfare, which is also deserving of notice for the very tasteful combination of colours in the polychromatic decorations. These recesses are carried to the ground, enabling the spectators to stand within them; but even when this is not done, a very good effect may be often obtained, with perfect architectural consistency, by recessing the window from above the height of the shopboard, and bringing the supporting columns to the front. An example of this may be seen in the Fleet-street front of a stationers' shop at the corner of Chancery-lane; and an inspection will show that the space for display is not appreciably obstructed, while the architectural effect in itself forms a feature of attractiveness altogether wanting in the common unrelieved plate glass constructions.

We shall conclude what we have to say on the subject next week.

STRONG ROOMS.

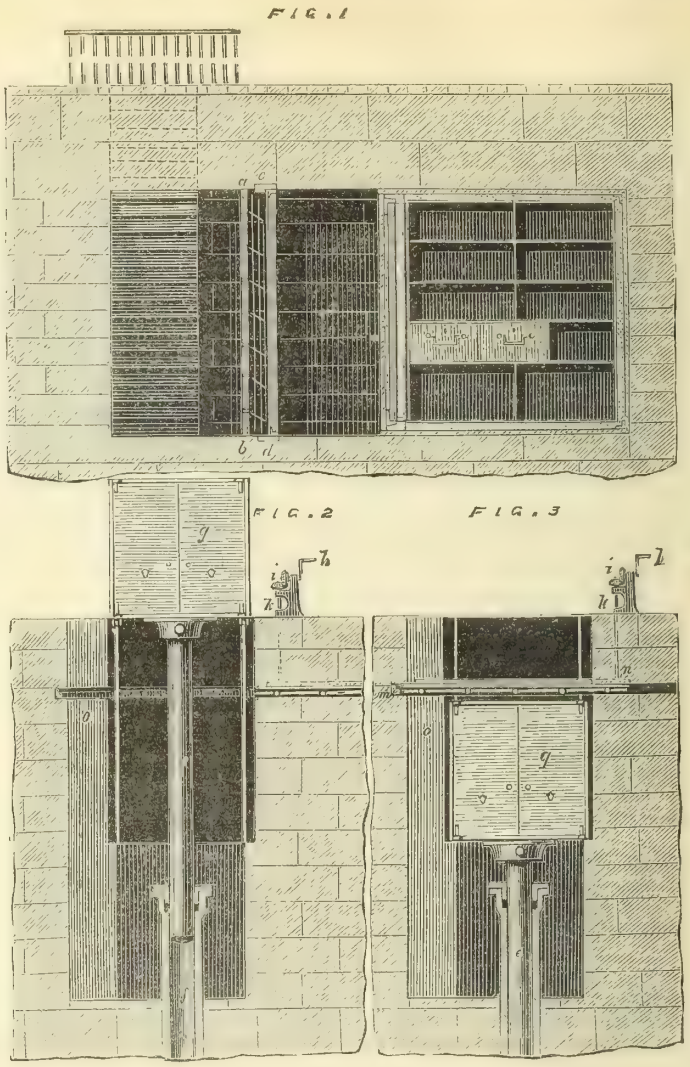
A STRONG room and a safe have so many points in common, that the consideration of one naturally leads to that of the other. Our remarks upon safes will no doubt be fresh in the minds of our readers, as also will the sketch we gave of the means at the command of the burglar. In the present case we shall therefore confine our inquiry to those points in which the requirements and construction of a strong room are peculiar to itself.

In cases where more room is required than a safe will afford—and very large safes are weak—or where an extra amount of security against fire or thieves is aimed at, the use of a strong room is advisable.

However strong rooms may vary from each other in their details, they may be divided into the two types of which we give illustrations.

In fig. 1 is shown that type which is by far the most common, namely, an iron room or large safe built into a vault having steps, and an entrance door, with a ventilating gate for use in the day. In fig. 2 and fig. 3 we have a totally different construction. In this case the strong room is itself movable, being placed upon a hydraulic ram, by means of which it is raised out of and lowered into a well of masonry. This construction of strong room is superior to any other, as it is more convenient in use, and safer from attack. The advisability of its adoption depends upon considerations of which we shall speak further on.

In fig. 1 the strong room and vault are both shown in section. Of the construction of the steps and passage it is not necessary to speak, further than to observe that the latter should be made as narrow as is convenient for one person to pass along. The narrower the passage, the less chance of success would burglars have; for firstly, in a narrow passage, only one man could work at the door at a time; and again, his movements would be much restricted; in fact, a heavy hammer could not be used with nearly so much effect as in a wider space, while the use of a crowbar would be still more difficult. The first means of closing the passage is the ventilating gate *a b*, which is made of strong iron or steel bars, and fitted with a good lock in a strong steel box. The object of this gate is merely to close the vault during business hours; at the same time, its presence—if it be well made—would not exactly help the operations of thieves. Inside the ventilating gate is placed the real safe-guard of the vault, namely, the iron or steel door, *c d*. As we have dealt with the fastening of iron doors under the head of safes, we need not say more here than that this door should be of the most massive description, and with the best fastenings that can be had. Supposing that burglars, by a prolonged and skilful attack, should force this door, they should find the door of the strong room itself at least as massive and well fastened. As regards the masonry, its materials should be of the very best. The best stone to use is granite, and the blocks should be set in cement, and be also dowelled together. Amongst the minor precautions which may be adopted with advantage is that of completely covering the inside of the vault and both sides of the outer door with a dead black. Such a precaution would greatly hamper the operations of burglars, who would find it almost impossible to light a place so prepared.* Of course, care should be taken in all cases that no gas is left on near the vault to afford means of light at improper hours.



It will be seen that the strong room is represented as being chambered and lined with fireproof composition. To this many may object, but such objection is not really valid, for the following reasons. In constructing a room of this kind, every possible precaution should be used, as, if the contents be of such value as to demand the use of special means of security, those means should be as complete as they can be made. Again, the extra cost of the fireproofing will form but a very slight percentage of the total cost, as the masonry, ironwork, and fastenings will chiefly swell this. Lastly, though fire will not penetrate through massive masonry, sufficient air at a high temperature may find access to the interior, and so endanger papers of value. If, however, the evaporating composition be used, the entry of such heated air would only cause the evolution of vapour. If any one should doubt the power of hot air or gas from a fire, let them consider the analogy of a reverberatory furnace. As the dimensions and details of each strong room must suit the purpose which it is intended to serve, it will not be necessary to enter into any further details, our object being to show a good type of construction, not to attempt a working drawing for any particular case.

Passing now to figs. 2 and 3, we shall describe such points as are special in the type of stronghold here shown. In fig. 2 the strong room is shown as raised up to the level of the office over the vault. It is supported by the ram *e*, and the water in the cylinder *f*. Where there is a good service pressure available—say not less than 30lbs. per inch—this will alone be sufficient to raise the weight of a very ponderous strong room with a moderate diameter of ram. If such service pressure be not available, pumping must be had recourse to. In this case, a second cylinder should be provided, having a pipe passing from it to the one used for raising the strong room. This pipe must have a valve capable of opening and closing the communication between the two cylinders, and its junction with each must be at the bottom, unless a passage be available for the water between the sides of the cylinders and their rams when the latter are "home." The diameter of the secondary cylinder may be greater than that of the primary cylinder *f*, and its length shorter. The secondary cylinder should be provided with a ram and load of such a weight as nearly to balance the strong room. Now, supposing the strong room *g* to be up as in fig. 2, the ram of the secondary cylinder will be down, and *vice versâ*. If when the strong room is at its full

* We believe this was first proposed by Mr. Robert Mallet, C.E., F.R.S.

height, the valve upon the pipe between the two cylinders be opened, the strong room will begin to descend, forcing the water from the cylinder *f* to the secondary one, and raising the ram and weight of this latter. This will go on till the strong room rests on its bed in the vault, as in fig. 3. By means of the winch handle *h*, and mitre wheels *i*, motion is then given to the vertical shaft *k*. This vertical shaft passes through the masonry to the centre line of the sliding door, which closes over the strong room, and shuts the vault. At the lower end of the shaft is a toothed wheel, which takes into a rack on the door. The door runs on wheels which fit rails placed in grooves in the masonry. When the door is in its closed position, it is bolted and locked. It may be advisable to point out the proper way to bolt such a door. Into the frame at *m*, either the screw-bolts we illustrated, or some similar contrivances, should shoot, as it is evident that plain bolts are here useless. In the side frames, of course, only plain bolts are used, shooting out sideways; while at the extremity *n*, the bolts must shoot either upwards or downwards. It may seem unnecessary to use so many fastenings, but it must be bourne in mind that every extra precaution is an extra obstacle to the burglar; and an outlay of a few shillings for a supplementary bolt may save the whole contents of the vault.

When the strong room is to be raised, the door of the vault is unlocked and unbolted, and moved into its recess in the masonry by means of the handle *h*. If there be the service pressure on, the valve on the pipe feeding the cylinder *f* is then opened, and the strong room is raised by the ram *e*. If a hand pump be used, the water is pumped from the secondary loaded cylinder, in that case provided.

The advantage of this loaded cylinder is that it eases the work of pumping to the exact extent of the pressure within it; thus the person working the pump has only to overcome the friction of the apparatus, and the small excess of the weight of the strong room over the counterbalance, which must be allowed to ensure its descent. The valves in the case of the water pressure from service mains, and the valves and pump connections in the case of hand pumping, must be placed in the man-hole *o*, so as to be beneath the sliding door. When service pressure is used, it should be turned off at night, at a place remote from the vault, and not of easy access for thieves; and if a pump be used, it should be taken away as soon as the strong room is raised, and carried to a place of security at a distance.

In rising and falling, the strong room is guided by rails placed vertically in the vaults, two at each side, as shown. Against these rails small wheels run; these wheels being carried in small brackets beneath the strong room, and fastened to it.

It will be observed that in this type of stronghold the door is protected from attack, even if the door of the vault itself be got back, so long as the room is not raised to the top of the vault; hence the importance of turning off the water, or removing the pump, as the case may be. A further important element of security is to provide efficient means of locking the strong room down in the vault, by means of bolts shooting into iron boxes built into the masonry. With such precautions it becomes impossible for thieves to raise the room to attack the door; in fact without the water service, or means of pumping, they could not well succeed in raising a room of any considerable weight. Their efforts, therefore, should they force the first door, must be confined to the top of the room, or the parts exposed by the man-hole *o*. In the latter they cannot do much, as this man-hole is only to be made large enough to afford access to the cylinder *f*, for the purpose of packing the gland, or attending to the pipes.

Of course, the same remarks which apply to the masonry in fig. 1 are also applicable here. If the hints we have thrown out in the course of these articles be acted upon in the case of safes and strong rooms, we feel confident that the money laid out will not be, as it now so often is, misspent; and we can promise burglars a tough job, and no plunder, when they try to "crack a crib" so prepared.

One or two hints we should like to throw out to those who have the responsibility of giving out the work in these cases. First the system of competitive tendering will not be likely to secure good work; and such a job as a strong room may well be excepted from all cutting down in price and quality. *A penny saved here may be a pound lost.* Secondly, no firm unprovided with really good machine tools can turn out a good strong room. Therefore, unless good serviceable lathes, planing and drilling machines can be shown, the work should not be given. Bad drilling machines and bad drills lead to bad rivetting and other evils; bad lathes turn out bad centres and bolts; and doors chipped and filed are not to be expected to fit as though they were planed in a workmanlike manner. It is high time that the making of such important productions as safes and strong rooms, and their fastenings, were conducted as a scientific branch of manufacture, and not as the work of a nondescript between an inferior smith and a tinker.

THE OUSEBURN VIADUCT.

TWO years ago great anxiety was manifested as to the alleged unsafe condition of the Ouseburn Viaduct, which constitutes a portion of the North-Eastern Railway, and situated as it is within a short distance from Newcastle, on the main north line, it was imperative that this public feeling of insecurity should be speedily removed. After their attention had been prominently called to the subject, the company determined, in order to restore the confidence of passengers, to thoroughly reconstruct the bridge by substituting iron work for the wood then in use. The amount of traffic over the viaduct was so large and important that it was impossible to stop it during the alterations, and to secure a continuance of the use of the rails, while at the same time the work of restoration was going on, presented a task full of difficulties and hazard. The reconstruction, however, has now been completed, and as the traffic was never suspended for a single hour in consequence of the operations, the result is a grand feat of engineering skill, of which Mr. Harrison, the consulting engineer of the company, and Mr. John Bourne, the resident engineer, have every reason to feel proud. The old bridge was constituted of five laminated wooden arches—three spans of 116ft. each, and two spans of about two feet less each, and the first step towards the restoration was taken in March, 1868, by Mr. Geo. Bailey, contractor, Newcastle, who for the support of the deck of the bridge erected a large temporary staging, which brought an increased strength to the timber joists which carry the longitudinal baulks for the rails. This erection, which of itself cost a large sum of money, and was in reality almost a complete new bridge, having been completed to the satisfaction of the officers of the company, and tested in order that no mistake might be made, the process of removing the old wooden arches was commenced. The extreme westernmost arch was first taken down, and massive wrought iron spandrels and girders, manufactured at S. Peter's, by the Weardale Iron Company, of which Messrs. John Rogerson and Co., of Newcastle, are the agents, were introduced without loss of time. The same operations were brought to bear on each of the other arches in turn, and at the close of last year the extensive undertaking, into which skill of the highest order and unlimited expense and experience were all thrown, was brought to a successful conclusion, while at the same time the architectural style of the old structure was fully maintained. The whole work has been most satisfactorily carried out by the contractors, and the character of it has been tested by immense pressure to be substantial and safe. Many of the North-Eastern directors have also inspected the bridge, and have expressed themselves much gratified with the results achieved by their engineers. A northern paper states that the company contemplate reconstructing Willington Viaduct, on the Tynemouth branch, upon the same plan, and that the works will shortly be commenced.

The Surveyor.

PRINCIPLES OF LEVELLING.

(*Concluded from page* 279.)

NOW, as the atmosphere is supposed to consist of an infinite number of successively superposed strata (represented by the occult lines in the figure), gradually increasing in density and in refracting power as they approach the earth's surface, the ray proceeding from the horizontal point C_3 to the eye at B_2 instead of pursuing the rectilineal direction C_3 B_2 is refracted more and more as it enters each lower or denser stratum, and describes the slightly curved line C_3 *a* B convex upwards;* and since every object is seen in the direction the ray from it has on arriving at the eye, the point C_3 is observed at C_4 in the direction of the tangent B_2 C_4 to the refracted ray C_3 *a* B_2 at B_2. Hence the height C_3 C_4 due to refraction is additive, and must be taken from the height C_2 C_4 due to curvature, which is subtractive, to obtain the true correction C_2 C_3 for curvature and refraction combined.

But the amount of refraction varies with every change in the temperature and density of the air; for heat, by dilating the air, renders it light, and diminishes its refracting power, and cold by contracting it makes it heavy and increases that power. The refraction is also influenced by variations in the humidity of the air. When, therefore, the air is warm and light, the ray is less refracted, and the point whence the ray emanated is apparently less elevated above its true place than when the air is cold and heavy.† Under these circumstances the same formula that gives the value of refraction for one state of the atmosphere will not give it correctly for any other; consequently a mean or an approximate formula only, deduced from the values of various refractions, can be employed.

The correction for the refraction of celestial objects is proportional to the tangent to the zenith distance, and is expressed, when the pressure and temperature of the air are respectively 29·6in. and 50° Fahrenheit, by the formula

$$r = 57'' \times \tan.\ (z - 3\,r),$$

where r is the mean refraction, and z is the zenith distance. A table calculated from this formula, with corrections to be applied when the air varies in pressure from 29·6in, and in temperature from 50°, is given in treatises on geodesy and astronomy.

But between 80° from the zenith and the horizon refraction increases downwards so rapidly, and is so irregular, owing to exhalations, dust, and vapours floating in the atmosphere, that little or no dependence can be placed upon the results given by the above rule. For this reason different geodetic observers have deduced and adopted different coefficients for the value of terrestrial refraction, in terms of the arc of distance between the object and the observer.

In the Trigonometrical Survey of England and Wales, mean refractions in altitude of the station points of the triangulation were deter-

* The nature of the curve into which the ray is refracted cannot be determined, because the temperature and density of the air are perpetually changing. It may, however be assumed as osculating with a circle, the radius of which, in the average state of the air, is about seven times the earth's radius.

† Sometimes local heat or cold renders the strata of air near the earth rarer below than above, with sometimes a denser stratum intervening. The rays from a distant object, by passing through strata of air so disposed, are bent or refracted convex downwards, and sometimes both convex downwards and upwards, whereby the object is seen depressed instead of elevated, and sometimes both elevated and depressed, one image being erect and the other inverted. These effects, which are known by the names of *looming* and *mirage*, may be observed by looking at a distant object along any surface or substance glowing intensely by the heat of the sun's rays, or made red hot, or through a transparent phial containing clear liquids of different densities floating one upon the other

mined very accurately. The highest was $\frac{1}{7}$ and the lowest $\frac{1}{34}$, but the greater number varied from $\frac{1}{10}$ to $\frac{1}{16}$ of the arc of distance between the stations, the mean of which, $= \frac{1}{13} = \cdot077$ very nearly,* may be taken as the value of refraction of terrestrial objects in the mean state of the atmosphere with regard to temperature and density.

Now, denoting the height due to curvature corrected for refraction by h', and reducing the square of the distance d^2 in the formula $h = \frac{2}{3} d^2$ for curvature by ·077 of itself, thus $(d - \cdot077\, d)^2$, the formula becomes $h' = \frac{2}{3} (d - \cdot077\, d)^2$, or by deduction therefrom, $h' = \cdot5666\, d^2$.

This formula, which gives the same results as the preceding, may be expressed in words thus:—The product arising from multiplying the square of the distance d^2 in miles by ·5666, is the joint correction for curvature and refraction in feet. The following are examples by this rule, corresponding to the examples previously given by the rule for curvature:—

At two miles: $h' = \cdot5666\, d^2 = \cdot5666 \times 2^2 = \cdot5666 \times 4 = 2{\cdot}266$ft;

At three miles: $h' = \cdot5666\, d^2 = \cdot5666 \times 3^2 = \cdot5666 \times 9 = 5{\cdot}099$ft.;

And at four miles: $h' = \cdot5666\, d^2 = \cdot5666 \times 4^2 = \cdot5666 \times 16 = 9{\cdot}065$ft.

Now putting h'' for the height due to refraction, and subtracting $\frac{17}{30}$, $= \cdot5666$ in the formula for curvature corrected for refraction, from $\frac{2}{3}$ in the formula for curvature, thus $\frac{2}{3} - \frac{17}{30} = \frac{60}{90} - \frac{51}{90} = \frac{1}{10}$ we have the formula $h'' = \cdot1\, d^2$, which may be stated in words thus:—The product of the square of the distance d^2 in miles multiplied by ·1, is the correction for refraction in feet. The following are examples by this rule, corresponding to the examples already given for curvature, and for curvature and refraction combined:—

At two miles: $h'' = \cdot1\, d^2 = \cdot1 \times 2^2 = \cdot1 \times 4 = \cdot400$ of a foot;

At three miles: $h'' = \cdot1\, d^2 = \cdot1 \times 3^2 = \cdot1 \times 9 = \cdot900$ of a foot;

And at four miles: $h'' = \cdot1\, d^2 = \cdot1 \times 4^2 = \cdot1 \times 16 = 1{\cdot}600$ft.

By reference to the last formula and examples it will be noticed that refraction increases the altitude of objects by a quantity in feet equal to $\frac{1}{10}$ of the square of the distance in miles. Thus an object at the distance of twenty miles is apparently elevated above its real position by refraction

$$= \frac{1}{10} \times 20^2 = \frac{1}{10} \times 400 = 40\text{ft.}$$

The height due to refraction is also

$$= \frac{1}{10} \div \frac{2}{3} = \frac{1 \times 3}{10 \times 20} = \frac{3}{20} = \cdot15$$

of the height due to curvature. Hence the product derived from multiplying the curvature by ·15 is the correction for refraction, and the remainder resulting from subtracting that product from the curvature is the joint correction for curvature and refraction. For example:—The earth's curvature at the distance of five miles is $h \frac{2}{3} d^2 = \frac{2}{3} \times 5^2 = \frac{2}{3} \times 25 = 16{\cdot}666$ft.; then the refraction at that distance is $16{\cdot}666 \times \cdot15 = 2{\cdot}500$ft., and the curvature corrected for refraction is $16{\cdot}666 - 2{\cdot}500 = 14{\cdot}166$ft.

Having deduced rules for correcting the effects arising from the curvature of the earth and the refraction of the atmosphere, it remains now to introduce examples showing how the true difference of level between two given points (say 2¼ miles apart) may be found by the telescopic spirit level placed first, midway between them, by which curvature and refraction may be avoided or neutralised; second, over one of them, by which it is necessary to apply the correction for curvature and refraction to the difference between the staff reading and the reading at the instrument; and third, unequally distant between them, by which it is requisite to apply the difference between the corrections for curvature and refraction at the unequal distances to the difference between the staff readings.

First Method.—The instrument is set up at a point midway between the two points, and the line of sight of the telescope, adjusted truly horizontal by the spirit level, cuts the vanes on the staves, held vertically on them, at 15·67ft., and 8·39ft. respectively. Now, as the two points are equally distant from the vertical passing through the axis of the instrument, the two points on the staves intersected by the line of sight are also not only at equal distances therefrom, but equidistant from the centre of the earth, and on the same true level. The heights due to curvature and refraction are likewise equal each to each, and therefore the difference between the apparent heights, or the staff readings, $= 15{\cdot}67 - 8{\cdot}39 = 7{\cdot}28$ft., is the *true* difference of level between the two points.

Second Method.—The instrument is now placed over one of the two points, the height from which to the centre of the eye-piece of the telescope is 4·82ft.; and the horizontal line of sight directed by the telescope intersects the vane on the staff, held vertically on the other point, at 14·97ft. above it. Then, since the correction for curvature and refraction combined at 2¼ miles is $h' = \cdot5666 d^2 = \cdot5666 \times 2{\cdot}25^2 = \cdot5666 \times 5{\cdot}0625 = 2{\cdot}87$ft. the *true* difference of level between the two points is $= (14{\cdot}97 - 4{\cdot}82) - 2{\cdot}87 = 10{\cdot}15 - 2{\cdot}87 = 7{\cdot}28$ft. as before. It is obvious by this method of levelling that there would have been an error of 2·87ft. in the levels of the two points if the difference between the heights of the instrument and the staff reading had not been reduced by the amount due to curvature and refraction.

Third Method.—The instrument is now removed to an intermediate point ¾ and 1½ mile respectively from the two given points; and the horizontal line of sight of the telescope cuts, firstly, the vane on the staff held on the the nearest point at 14·06ft. above that point; and secondly, the vane on the staff placed on farthest point at 6·06ft. above it. Now at ¾ mile the joint correction for curvature and refraction is $h' = \cdot5666 d^2 = \cdot5666 \times \cdot75^2 = \cdot5666 \times \cdot5625 = \cdot302$ of a foot; and at 1½ mile it is $h' = \cdot5666 d^2 = \cdot5666 \times 1{\cdot}5^2 = \cdot5666 \times 2{\cdot}25 = 1{\cdot}274$ft. Then as the difference between the joint corrections is $= 1{\cdot}274 - \cdot302 = \cdot972$ of a foot, the *true* difference of level between the two points is $= (14{\cdot}06 - 6{\cdot}06) - \cdot972 = 8{\cdot}000 - \cdot972 = 7{\cdot}28$ft. as before. In this case also, if the difference between the staff readings had not been corrected for the difference between the curvatures and refractions, there would have been an error in the levels of the two points of ·972 of a foot.

From the foregoing examples of levelling it is evident that the method of placing the instrument in the middle, or as nearly so as possible, between every two points whose difference of level is required, is that which should always be adopted in practice. This not only avoids the necessity for making the corrections for curvature and refraction, but should the instrument itself be out of adjustment the error arising from the inclination of the line of sight would be equal in both or opposite directions. It should, however, be observed that when two points are not far apart, wherever the instrument may be set up relatively to them, the correction for curvature and refraction is so slight that it may be neglected; for at 8 chains, or $\frac{1}{10}$ of a mile, it is only $\frac{1}{200}$ of a foot, which in practical levelling would be inappreciable. The first method, however, is that which the leveller should invariably follow so far as circumstances will permit, whether it be to find the difference of level between two points near each other by one operation, which is called simple levelling, or far apart by a succession of similar operations, which is called compound levelling; or whether it be to find the difference of level between successive pairs of points for the purpose of forming a verti cal section of the ground for a road, a sewer, or a railway. These operations constitute what is termed the practice of levelling, to teach which will be the object of another paper.

The following table, calculated by the preceding formulæ, gives the corrections for curvature, for refraction, and for curvature and refraction combined, in feet and decimals of a foot, for distances in miles, from ¼ to 20 miles.

Distances in Miles.	Corrections in Feet.		
	For Curvature.	For Refraction.	For Curvature and Refraction.
¼	0·041	0·006	0·035
½	0·166	0·025	0·141
¾	0·375	0·056	0·319
1	0·666	0·100	0·566
2	2·666	0·400	2·266
3	6·000	0·900	5·100
4	10·666	1·600	9·066
5	16·666	2·500	14·166
6	23·997	3·600	20·397
7	32·663	4·900	27·763
8	42·662	6·400	36·262
9	53·994	8·100	45·894
10	66·660	10·000	56·660
11	80·658	12·100	68·558
12	95·990	14·400	81·590
13	112·655	16·900	95·755
14	130·653	19·600	111·053
15	149·985	22·500	127·485
16	170·649	25·600	145·049
17	192·647	28·900	163·747
18	215·978	32·400	188·578
19	240·642	36·100	204·542
20	266·640	40·000	222·640

John Phillips.

S. JOHN'S CHURCH, HAILEY.

We illustrate this week a new village church in Oxfordshire. On plan, the building comprises a chancel, nave, and north aisle, with a vestry at west end of aisle, and a south porch. The stone used for facing both the inside and outside was quarried in the parish, that on the inside being worked with extra labour to a flat tooled face. Milton stone is used throughout for all the freestone work. The sittings are rush-bottom chairs, except choir fittings, which are carried out in pitch pine, and the holy table is of English oak. The roofs are constructed of Baltic fir and pitch pine, unstained and unvarnished, with plastering between rafters, and are covered with Stonesfield slates. The church is tiled throughout, and heated with a hot air apparatus by Messrs. Hayden. The stained glass for chancel was supplied by Messrs. Clayton and Bell. Accommodation is provided on plan for about 230 sittings, and the cost of the building is about £2000. The church was built by Mr. Groves, of Milton, from the designs and under the superintendence of Mr. Clapton C. Rolfe, Architect, of Oxford.

Royal Institute of the Architects of Ireland.—At the Ordinary General Meeting held last night, a paper was read by Mr. William Fogerty, F.R.I.B.A., entitled, "Notes of a Recent Tour in Italy."

* French mathematicians reckon the medium quantity of refraction at ·079 of the whole distance. It has been known in very warm damp weather to fall so low as ·03, and in very cold foggy weather to rise so high as ·17. But these extremes were rare.

Civil Engineering.

TUBULAR FOUNDATIONS.

SOME short time ago we gave a description of screw piles, with especial reference to their suitability for foundations in situations where, from the nature of the ground, scarcely any other means were available. There are, however, various other principles of foundations which have their own proper sphere of utility and application, where they become in their turn the correct means to employ. Among these, is the hollow or tubular system, which has been used in numerous works of magnitude with great success, and is perhaps better adapted for a very large scale of construction than the solid principle. Tubular foundations consist of ho'low cylinders, either of wrought or cast iron, which present nothing particularly worthy of notice. It is the manner in which these cylinders are "got down" that is the interesting fact in connection with the use of them. For effecting this purpose there are two methods more recognised and more generally known than others. The one is the vacuum or Potts' method; the other Triger's, or that of compressed air. A brief examination of their relative merits will be not without interest, and we will commence with the former. If we imagine a hollow tube, or better still, a hollow cylinder, hermetically sealed by a strong and closely fitting cap at the upper extremity and open at the lower, and the interior of it put in communication with an air pump, and the air inside exhausted, the following result will ensue. So soon as a tolerably perfect vacuum is formed, and the equilibrium between the external and internal pressures destroyed, the preponderance of the former becomes manifest. This is demonstrated by the tendency of the water to force its way into the cylinder, which after disintegrating and undermining, as it were, the earth in the immediate vicinity, it finally accomplishes, and a mixed mass of water and the debris of the substrata is driven into the tube. At the same time the cylinder descends through the loosened stratum by virtue of its weight, and that of the atmospherical pressure generated upon its top by the destruction of the normal state of equilibrium. Affairs progress in this manner until a sufficient quantity of debris is collected in the cylinder, when by means of suitable manholes, provided for the purpose, it is removed, and the operation commenced *de novo*. An examination into the rationale of this process will at once indicate that there are three principal agents concerned in its accomplishment, which may be termed water, pressure or weight, and air. These are dependent upon other conditions, which may be different, individually or conjointly, according to the special circumstances of the case. Thus the upward or disturbing tendency of the water will be in proportion to the height of any given vertical section of it—in other words, to its depth. The effect produced by gravity or insistent weight alone will depend upon that of the cylinder itself and its appendages, while the action of the air will be in proportion to the more or less perfect manner in which the vacuum is made and maintained, and also to the superficial area of the top of the cylinder. As it is essential that the subtratum should be of a nature that will permit water to partially percolate through it, and break it up so to speak, it is clear that dense soils, including stiff clays, and very close and compact gravel, are not the proper kind upon which to employ this method of getting in foundations. It is manifest from this that too much caution and care cannot be exercised in ascertaining the exact character of the underlying strata, for it would be a great mistake to commence the process and subsequently discover before solid ground were reached, that it was inadequate to complete the work intended. The preliminary borings should always therefore be carried down to the same depth as that to which the foundations are to reach, or otherwise there is no reliable information to depend upon. Many serious errors have resulted from an undue attention to these points, errors which have only been rectified afterwards at a very considerable outlay of time, trouble, and money.

The inventor of the compressed air method was M. Triger, an able engineer, attached to the staff of the Ponts-et-Chaussées. He used the principle, firstly, in sinking a shaft for a coal mine. A portion of the strata it was sunk through consisted of a gravel so excessively permeable that it allowed the water to flow through in such quantities as to fill the shaft, and completely stop all operations. Under these circumstances M. Triger placed on the top of the cylinder or shaft an air bag, drove out the water by compressing the air in the cylinder, and then excavated the gravel by the ordinary means. This method, it must be acknowledged, is sometimes termed Hughes' method, although it would appear from the evidence that the balance is in favour of the honour of its invention belonging to the French engineer. Hughes' claim rests upon the fact that he was the first to apply the principle to the foundations of bridges, which he did at Rochester. It was originally intended to use Potts' method, but the divers came upon the remnant of some old Roman masonry, which was of such a hard and impenetrable character as to leave no hope of that principle being successful. But, after vanquishing this difficulty by compressing the air, another arose. The soil at a certain depth became so impermeable and dense that the water could not get away at the bottom of the cylinder, which, in nautical language, was completely "waterlogged." In this emergency a syphon tube was introduced, the longer branch of which descended into the cylinder, and the shorter passed through the top. The water, by the compression of the air, was driven up the long branch and discharged through the shorter, outside the cylinder. Once the advantage of this additional contrivance was seen and recognised, it became a permanent feature of this system ever afterwards. Since air, or any fluid in a confined space, presses equally in all directions, it is evident that the effect of the compressed air will be felt upon the inside of the top of the cylinder, as well as upon the water it forces out, consequently if this upward pressure be greater than the insistent weight of the cylinder, the latter will have a tendency to rise. This must be counteracted by weighting or loading the cylinders with an extraneous amount of material, which, in fact, has a double duty to perform. One consists in resisting the upward tendency, and the other in causing the cylinder to descend as the earth beneath becomes loosened and excavated. In this method, therefore, there appears something slightly paradoxical, as one of the agents is employed in nullifying what is partially effected by another. Regarding one as plus, and the other as minus, the absolute work done towards causing the descent of the cylinder would be expressed by their algebraical sum. It is frequently a consequence of this ambiguity that the cylinders descend with considerable irregularity, sometimes sinking almost imperceptibly, and at others going down with a sudden and violent jerk. This would not signify to any great extent, were it not that a sudden descent is rarely uniform. One part of the cylinder generally becomes tilted up, and much time is expended in restoring it to the perpendicular position. It is easy to perceive that a constant succession of these tilts, first on one side, and then on the other, would seriously interfere with the operation of sinking. Probably one of the most remarkable instances of the application of this method is that of the centre pier of the Saltash Bridge, erected by Brunel over the Tamar, near Plymouth. The rapidity of the tideway rendered the operations particularly difficult and hazardous, but the great engineer triumphed over all obstacles, and the Saltash Bridge justly ranks as one of the most remarkable feats in national engineering.

THE NEW WAVERLEY STATION, EDINBURGH.

THE Edinburgh Station of the North British Railway is about to be renewed, at a cost of £50,000. The present inelegant stone Waverley Bridge is, with the consent of the Town Council, to be replaced by an iron one. On this sanction being obtained, estimates will at once be taken for and the work commenced of erecting a temporary bridge, 40 feet wide, on the east side of the present bridge and over a portion of the town property. The bridge proposed to be substituted for the present ungainly structure will be in three spans of 100ft. each, with a breadth of 70ft., this width corresponding with the recently widened roadway at the north end. On the east side, where the present booking offices stand, a small portion of the existing buildings will be retained for parcel offices. The new booking offices will be on the platform level, and the main access will be by the arched roadway already existing. This roadway will be widened to 40 feet. The main features of the new arrangement will be the two extended platforms for the main line traffic. On the south the "down" platform will be 1530ft. long, and on the north the "up" platform will extend for 1000 yards. In addition to these principal platforms, a series of "docks" will be constructed on the site of the present goods station east of the North Bridge, the whole of the goods traffic being removed to the extreme south of the railway ground. The plans for the new station have been prepared by Mr. Bell, resident engineer of the company.

THE TAY BRIDGE SCHEME.

A MOST important railway project has been sanctioned by a committee of the House of Commons. At present communication between Edinburgh and the other towns on the east coast of Scotland is mainly obtained by means of steamboats which ply across the Firth of Forth and the river Tay in conjunction with the trains on the North British Railway. The time thus lost is very considerable, and besides, the dangers and discomforts of the passage across the two rivers in stormy weather are such as to induce many railway travellers to prefer the circuitous route to the North *viâ* Sterling and Perth. The North British Railway Company proposed years ago to construct a viaduct over the Forth about five miles long, at a cost of about £2,000,000, but that scheme was abandoned. Latterly, however, the idea of bridging the Tay has been mooted, and the pecuniary support accorded to the proposal has been so encouraging as to justify the directors in applying to Parliament for the necessary powers, which have been granted. The bridge will be two miles long, and will be built upon arches, though only a small number of the arches will span the navigable river. The Parliamentary estimate of the cost is £350,000, but the actual outlay is likely to exceed that amount. It is expected that the work of constructing the bridge will be commenced without delay.

NARROW GAUGE RAILWAYS.

THE commission of Russian engineers who lately visited England for the purpose of seeing Mr. Fairlie's narrow-gauge plant, and the Festiniog Railway where his engines are at work, have reported strongly in favour of the system. They recommend it to be adopted for a portion of the railway between S. Petersburg and Moscow, and estimate the cost of construction at about £4500 per mile.

PROPOSED NEW ROUTE TO INDIA.

A NEW route has been projected to India, which it is believed will be a formidable rival to that *viâ* Brindisi. A railway is proposed to be built connecting the Austrian lines with the harbour of Santi Quaranta, in Epirus, *viâ* Dalmatia, Bosnia, and Albania. It is stated that this harbour could be made to hold a sufficiently large number of ships for the purpose, and that the country in its vicinity is very fertile, and capable of affording a great opening for its commercial development. It is 760 miles nearer Alexandria than Brindisi, and ships using it for the Indian traffic would avoid the dangerous navigation of the Archipelago.

ON ROMAN ART.*

PART I.

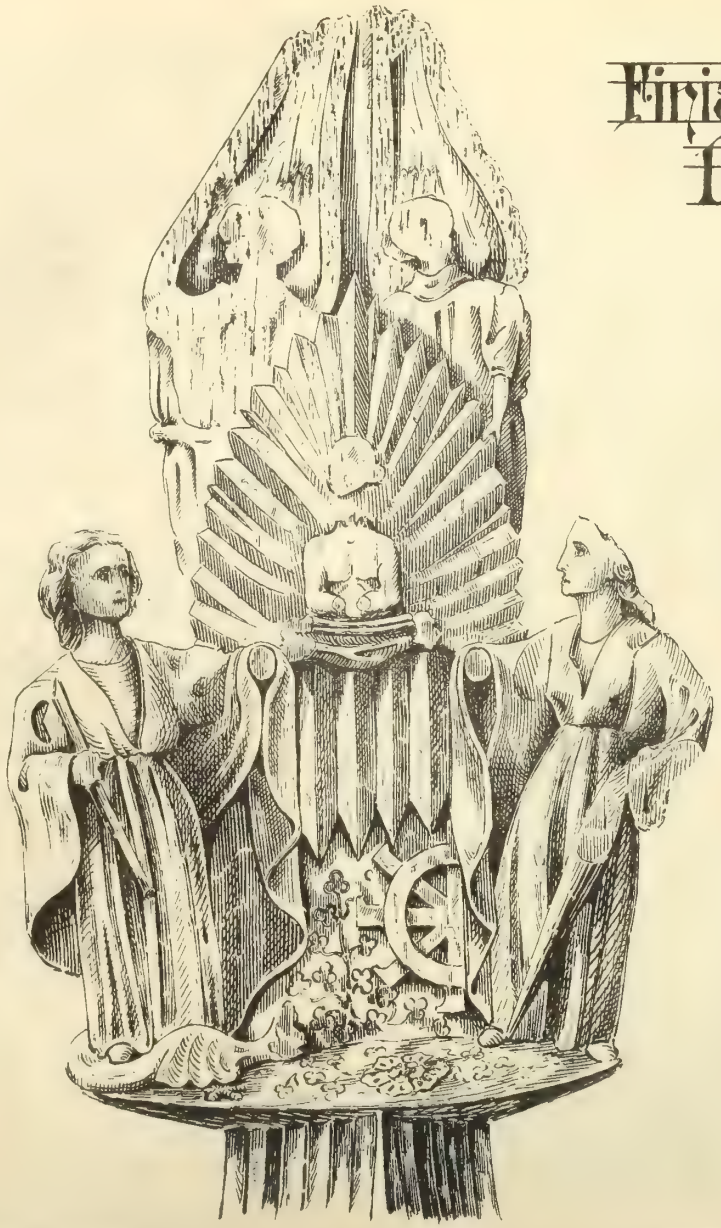
THE study of Etruscan art leads us to that of Rome, which was derived from the Etruscans but influenced and modified by that of the Greeks. In order to understand the characteristics of Roman art, we must first take into consideration the nature of the country and the physical influences which tended to produce the special Roman national type. Italy is a narrow strip of country accessible from every point by sea and by land, and from there the Romans had to develope themselves and to create a great empire. The people placed upon such a strip of land found it very difficult to maintain themselves in the possession of their settlements. They were therefore obliged to turn all their energies towards the strengthening and developing of their brute force. They were obliged to seek every means to avoid being attacked, and to cultivate their prowess and military genius so as to deter the surrounding nations from attacking them. The grand distinction between the Greeks and the Romans lies in the fact that the Romans were the inventors of a so-called State principle, that is, some abstract idea under which every one was to be ready to sacrifice himself, his family, life, possessions, and, in fact, his all, for the good of the State. This self-renunciation by the individual for the sake of the community was at the outset necessary, in order that the Romans might be able to defend and extend their country. The Greeks, on the other hand, had never submitted to the loss of individuality in the State principle. They considered the idea of a State principle as false to begin with, for a State, apart from or without individuals, is a nonentity, has in itself no existence, and is a mere abstract idea. The Greeks, then, said that the individual was everything, because individuals formed the State. If the individual be free, the State must be free, whilst, on the other hand, the State may be grand whilst the individuals are mere slaves. Carrying out these principles, the Greeks colonised, the Romans conquered. The Greek colonies were free daughters of the mother country, bound to her by the ties of a common love of beauty and reason. The Roman colonists were slaves, tied by military despotism to the iron wheels of the great State chariot. The Greeks humanised, the Romans regulated; the Greeks played at soldiers for fame's sake, the Romans were soldiers for the sake of conquest. The spirit of youthfulness is the distinguishing feature of the Greek; the Roman's characteristic is stern manliness. The Greek was free in thoughts and conceptions, in life and art; the Roman felt everywhere the inexorably despotic hand of the State, in the shape of all sorts of phantoms, pressing hard on his shoulders. The Roman had to submit to the authority of the State and the law—and to the paternal authority. He had to obey magistrates who resided he did not know where, and laws he did not know what for; but he knew that there was an infallible State power called Rome that had always a lictor ready with a hatchet, or an innumerable quantity of soldiers on horse or on foot, to punish any refractory who should dare to venture to act against the ever-present, ever-active, ever-vigilant State abstraction. Whilst in Greece the individual man was developed—which development took the direction of art, especially architecture and sculpture—in Rome the individual was displaced by military force, which crushed the conquered through the conqueror, the poor through the rich, the client through the patron, the plebeian through the patrician, humanity through the gods, the individual through the State. The Roman was a mere unit in a large sum, an atom in a universe, a drop in an ocean. The Greek made the State serve him, and not the individual serve the State, which he regarded only as a means towards an end. To be protected by it, to have his bodily and intellectual faculties developed through it, was the light in which the Greek looked upon his State. He was a soldier without being a machine, a philosopher without being a pedant, and he worshipped his gods without dogmatic formulas. That Roman art took, under such conditions, a totally different development from that of Greece, is natural. The Romans were Aryans. The three principal elements which made up the first thieving, murdering band of those who gave life to the future mistress of the world were Pelasgians, Sabines, and Albans. The history of the Romans may be divided into three periods. During the first period they had kings. The seven names recorded during that monarchical period represent not as many individuals, but as many distinct periods of the early development of the State. Under Romulus the Romans established themselves as a community. Under Numa Pompilius they adopted some fixed religious system. Under Tullus Hostilius they organised their military forces, making themselves secure against constant attacks. Under Ancus Martius, having attained a more settled state, they proceeded to enjoy their security, and beautified their city. Under Tarquinius Priscus they found themselves divided into castes; patricians and plebeians were separated from one another. Under Servius Tullius a new order, that of the knights, was added; and under Tarquinius Superbus royalty disappears. During the second historical period, Rome appears with helmet, spear and shield, a dashing and calculating hero on the historical stage, and begins to conquer. Three hundred years' unceasing war with the Samnites, Latines, Phœnicians, and Greeks, made them so fond of fighting that the Republic turned her arms against herself, and she perished 30 B.C. by the triumph of Augustus over all his rivals. Arts and sciences could not possibly flourish under such conditions. During this period the Romans were mere imitators of the Etruscans in everything connected with art. Bridges and roads were constructed on a grand and imposing scale, as serviceable to a military State. Everywhere in their architecture a stern expression is observable; despotism lurks in every stone. In their religion they changed the beautiful and charming gods of Greece into severe military heroes, commanding, not winning admiration—possessing a certain kind of beauty, but a beauty which seems to demand, as an inexorable attribute, the worship and love which, with the Greeks, appeared the spontaneous offering of willing hearts. In the third period we see Rome in her pomp and splendour, decking out the inner hollowness, the gradual decay, with marble palaces, temples, basilicas, arcades, triumphal arches, amphitheatres, arenas, and baths (of which Rome alone possessed not less than 768). But the progressive force knocks already at the gates of this artificial usurper of the world's dominion. The Teutons, with their Aryan strength, come forward to be the avengers of all the glittering misery brought about the world by this temporal and spiritual tyrant of the setting ancient world. Religion, a Roman invention in the sense of tying somebody down to certain formulas, borrowed her superstitions from all parts of the world, especially from the Etruscans, Egyptians, and Greeks. Auguries, auspices, sybilline oracles, the entrails of beasts and human beings, flashes of lightning, the rolling thunder, the flight of birds, served the priests to determine the will of the gods, and to fill the people with gloomy horrors. They disfigured the idea of the Eastern God, making him more revengeful, more jealous, more implacable, more threatening, and more crushing to the imagination of man. Caprice was the principal attribute of Jupiter, the Thunderer, governing by no moral law, but by mere force, revealing himself in the lightning flash, the terrifying earthquake, or the volcanic phenomena of the Roman Campagna. Amidst the thirty thousand deities with which the Roman peopled the invisible world, there was not one that gave him comfort and protection. All of them horrified and frightened him. The Romans had a divinity of peace, of plague, of hunger, of war, of pestilence, of fever, of mildew, of death, and even a Dea Cloacina; they adored water, stones, serpents, and wild beasts. Though their divinities were here and there sculptured in the Greek fashion, this was only their outer form—their spiritual conception was that of wrath, mischief, and ferocious hatred. This must explain to you why sacrifices continued—why their high priests were a kind of spiritual butchers, who tried to appease the anger of the gods with the smoke of burning bullocks, to nourish them with the fat smeared upon their statues, and to quench their thirst with cupfuls of blood poured over them. Later, eager for a more concrete god than their stone statues, they found a corresponding living divinity in the person of their emperor. Earth could offer nothing more divine in the sense of a majesty at once recognised and obeyed, and paganism did but push its principles to their conclusion in deifying the Cæsars, but reason fell to the lowest depths of degradation, and the Egyptians grovelling before the beasts of the Nile outraged humanity less than the age of the Antonines, with its philosophers and jurist consults, rendering divine honours to the Emperor Aurelius Commodus, who fought 735 times as a common gladiator in the arena, before the eyes of his degraded but delighted people. This explains to us also their public games, which contrast particularly with those of the Greeks, with whom beauty and intellect reigned supreme. The Romans had gladiators specially trained for life and death combats. Criminals and slaves were condemned to exhibit themselves in fearful struggles with lions, bears, and tigers, rendered more savage by being kept without food. Such shows they exhibited at the Coliseum, where the gladiators used to greet the Emperor with the memorable words, "Those devoted to death salute thee!" In the Greek tragedy, idealistic human sufferings affecting the depths of the soul, occasioned by a conflict with life, and finding a solution according to the stern laws of fate or destiny, interested the spectators. The Romans instituted the cruel reality of bodily sufferings, blood in streams from torn limbs, the rattle in the throat which signifies death, and the expiring gasp—these are things that delighted Roman men and women, youths and virgins. Like their religion was their literature. Virgil was an imitator of Homer, Horace of Pindar, Phædrus of Æsop, Terence of Euripides, and Plautus of Aristophanes. But in all these imitators and their works prevails about the same difference as between the noble idealistic humour of Aristophanes and the coarse comedies of Plautus, which kept, without any effort of imagination, to the reproduction of daily life, both in colouring and matter. They excelled in didactic poetry and satire, the cool calculating spirit predominating with them over the higher idealistic power of conception. Art with them was never that glorious emanation of imagination of the poet's sacred ideal of the gods, the indispensable delight of the people, as in Greece. Art was with them the handmaid of power, authority, riches and luxury. Art was a slave, well-fed, well-clad, well-kept, by which to make power more powerful, to dismay the people, and to attract and subject them. The Roman character was dry, geometrical, monumental. Their architecture was in perfect accordance with their national character, grand in design, variegated in combinations of new and chiefly practical requirements, and distinguished by a studied purity of execution. Their system of architecture took its origin in Etruria, and was embellished with all the highest beauties of Greek art. One important element of Etruscan art lastingly prevailed in Roman architecture—the arch, which we have already traced in India, and which serves as a bridge to connect, by an analogy in architectural construction, the Aryans on the Ganges and Indus in Asia, with the Etruscans and Romans in Europe. By means of the arch, the Romans have executed tasks more grand and various than any imposed upon architecture before or since. The Romans invented the cross-vault. The third form of vault, the cupola (also used in Indian temples) was called forth by the favourite circular-buildings of the Romans. It was a half-hollow globe, formed of horizontal layers of wedge-like stones, showing the principle of the arch applied to a circular ground plan. The half-cupola arches were frequently used in semicircular niches *(apsidæ.)* All this would have been monotonous had they not introduced the rich colonnades of the Greeks, of which the Corinthian predominated. But a variety was also produced by the so-called Composite or Roman capital, a coarser and more contracted form of the Ionic capital being placed with arrogant clumsiness on two rows of carved acanthus leaves. The three Greek orders were often found on one and the same building—the Doric on the lowest, the Ionic on the middle, and the Corinthian on the highest story. In Roman statuary the principal ruling element was delight in suffering and distorted forms. There was nothing joyous about it: all was severe and stern, and even when it had come under a more direct Greek influence, the too-great length of the bodies and the smallness of the heads expressed rather brute force than grandeur of intellect, showing the superiority which physical and muscular energy held in the Roman estimation above mental and intellectual power.

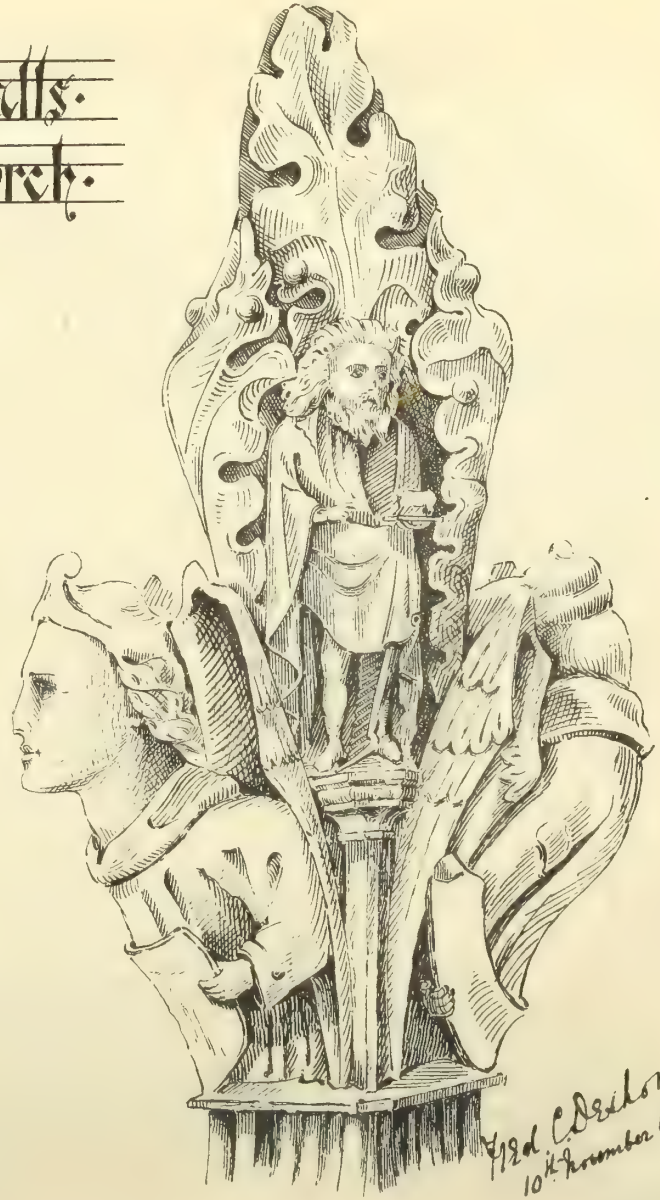
* Abstract of a lecture delivered by Dr. Zerffi at the South Kensington Museum

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A site for the new Liverpool Seamen's Orphan Asylum has been granted by the Liverpool Corporation, in the Newsham Park, one of the new parks recently thrown open to the public.

Finials · on · Stalls · Ludlow · Church ·





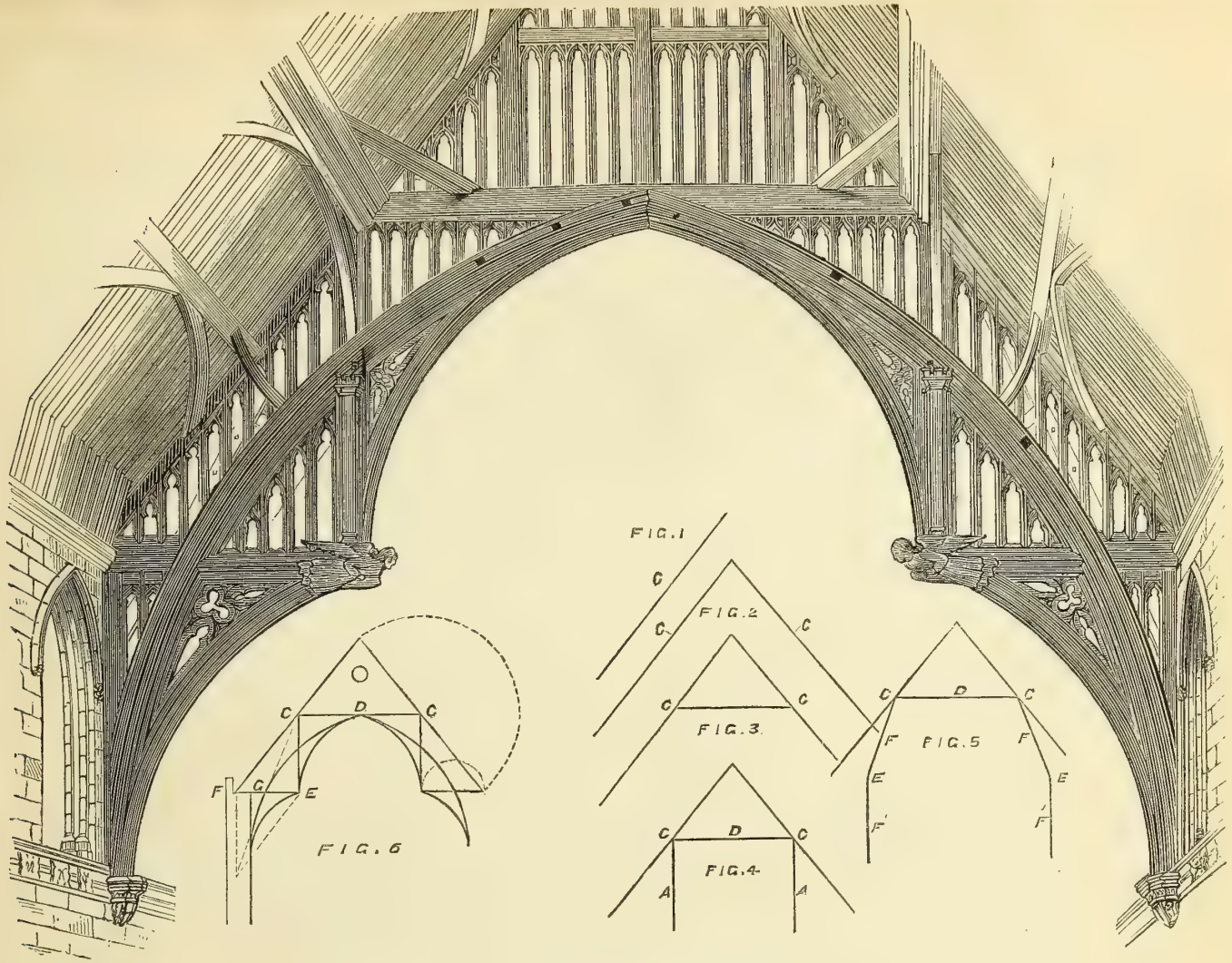
Fred C. Dickson
10th November 1874



Charles C. Rolfe & A.R.I.B.A. Architect.

St. John's Church, [illegible]

Photo-Lithographed by Whitemans Bateman Street.



ROOF OF WESTMINSTER HALL.

BRIEF CHAPTERS ON BRITISH CARPENTRY.

By Thomas Morris.

(*Continued from page* 286.)

ABOUT such a building as Westminster Hall there ought to be no lack of information, yet much uncertainty exists. If we inquire into the authorship of the present roof, conjecture points to the "distinguished architectonic prelate," a Britton calls him—William of Wykeham. Several biographies have been written, and the best is that of Dr. Robert Lowth, Bishop of Oxford; but there are some valuable annotations, by Dr. Ingram, in his Oxford "Memorials" (Art, New Coll.) "The genealogical history of some of the greatest benefactors of mankind is buried," observes this author, "in comparative obscurity. Of many individuals respecting whom very little is known but that they lived, and that they died, the pedigree nevertheless is usually traced, with heraldic precision, to the remotest verge of antiquity. We can number the various branches of some insignificant families, with their affinities and descents, and mark their progress from the parent stem, whilst everything connected with the domestic annals of a Wykeham, a Waynflete, or a Wolsey, is left in a state of considerable doubt and uncertainty." Must it not cease, then, to be strange, if little be authentically known about the construction of an edifice that stands by its intrinsic qualities so grandly out as does Westminster Hall among its more accurately recorded contemporaries?

Biographers are divided as to the place of Wykeham's education, but there are grounds for supposing that he spent some (Wood says five and a half) years at Oxford, though in circumstances too straitened to command the full advantages of the university. He had indeed no "scholarship," but it would be as unjust to insinuate as it is impossible to conclude that he was no scholar. His studies embraced mathematics, logic, divinity, and law. "His architectural genius," Dr. Ingram suggests, "led him perhaps to prefer Euclid to Aristotle," and for practical matters Chaundler gives him the highest credit. The general appellation of academical students, "Clericus," appears in all the patents granted to him before he obtained any church preferment, and he is described as "a person of as great genius, as extensive knowledge, and as sound judgment as any which that age produced."

On the completion of his studies he entered the service of his early patron, Sir Nicholas Uvedale, Constable of Winchester Castle, and William de Edynton, Bishop of Winchester, also employed him as agent, clerk, and attorney. At the Castle he, no doubt, found exercise for his skill in geometry and drawing, talents that were eminently calculated to attract Edward the Third, when he came from Portsmouth to spend some days at the castle, and at a time when he had similar constructions of his own in contemplation. At all events, Edward seems to have invited Wykeham to court, where he first appears as Clerk of the King's Works in 1356, at the age of thirty-two: Once in the sphere of ecclesiastical patronage he went into orders, and received the rectory of Pulham, Norfolk, in 1357, from which period his twofold greatness proceeded in a remarkable parallel. His benefice caused no relaxation of his secular duties or business habits, but was accepted and regarded as the consequence and reward of activity in the service of his royal master, a testimony of the satisfaction his great ability afforded. So completely did he become the king's man of business that Froissart said "everything was done by him, and nothing was done without him."

In April, 1359, he was appointed *superior operationum in Castro, Windsor,* and in attendance on the king at Calais, in 1360, he witnessed, as public notary, the treaty of Bretigny. The rebuilding of the castle was in active progress: "360 workmen were impressed to be employed on the buildings at the king's wages, some of whom having clandestinely left Windsor, and engaged in other employments for greater wages, writs were issued to prohibit all persons from employing them, on pain of forfeiting their goods and chattels, and to commit such of the workmen as should be apprehended to Newgate."

Wykeham's office was extended in 1361, he being now Chief Warden and Surveyor of the King's Castles of Windsor, Leedes, Dover, and Hadlam, and of the manors of Old and New Windsor, Wichmer, and several other castles, manors, and houses, and of the parks belonging to them. In 1363 he became Warden and Justiciary of the King's Forests on this side the Trent. He had power to appoint all workmen, to provide materials, and to order everything with regard to building and repairs, to hold leets and other courts, pleas of trespass and misdemeanours, and to inquire of the king's liberties and rights. Soon after this he was made Keeper of the Privy Seal, and "Governor or Chief Speaker in the great council of the nation." Thus in him were centered the affairs of sundry modern departments conducted by several of her Majesty's Chief Officers of State.

He built for the king in the Isle of Sheppy a castle, to which the name of Queenboro' was given, in honour of Philippa of Hainault, and a charter was given to the township in 1366. This castle was a large, strong, and magnificent edifice, but having no platform

for cannon, nor command of the sea, it was demolished after an endurance of about three centuries. His talents are said to have been equally displayed at the castles of Leeds* and Dover, both of which are also in Kent. "Although in these military structures" it has been remarked, "he had little scope for the genius displayed afterwards at Oxford and Winchester, they would have been sufficient to prove that he had already reached that degree of architectural skill which modern art can but poorly imitate." With his appointment to the bishopric of Winchester, on the death of his early patron, de Edyngton, in 1366, came enlarged opportunities for his favourite pursuit. He had now several palaces, and the princely revenues that enabled him to carry noble conceptions into perfect execution. The fruits of this elevation, however, are less discernible in the remainder of Edward's reign than in that of his successor, but the king's works probably received unabated attention. A writ to the sheriffs of different counties to impress 302 masons and diggers of stone was followed the year after by an impressment of glaziers, and operations were continued at Windsor till 1373. Wykeham must have been on terms of intimacy with all members of the royal family, but as the interests of those members diverged it must have grown difficult to maintain an equal friendship with all. He seems to have been in perfect accord with the Black Prince, and Richard II. regarded him with unqualified respect; but he had no friend in John of Gaunt, nor probably in Henry IV.

Attached to the see of Winchester were several residences—palaces, not merely in name, but importance. That in the metropolis was at Southwark, and the site of "Winchester Park" is now occupied by Southwark-street and a populous neighbourhood. There were palaces at Wolvesey, and South Walsham, his favourite abode. (He died there Sept. 27, 1404.) Farnham Castle, a sumptuous seat, maintains the position of a chief provincial residence, and continues in the occupation of the venerable Bishop Sumner, who has lately resigned the episcopal charge of the diocese. To this distinguished prelate Mr. Elmes dedicated his work upon dilapidations.

Wykeham's ever useful life is seen in its grandest aspect during Richard's reign. High in the king's favour, high in state and church, and high in temporal possessions, with his own elevation arose his munificent schemes for the promotion of learning and piety, dictated by the wants of his time, and deserving the gratitude of all coming ages. To these objects he devoted, with equal freedom, his pecuniary wealth and refined architectural skill. Some preliminary steps had been previously taken, but the king's license to found "Seinte Marie College, of Wynchestre, in Oxenford," is dated June 30th, 1379. The foundation stone was laid in March following, and occupation commenced April 14th, 1386. The popular appellation given to this establishment soon after its foundation has never been withdrawn, and it is now, as then, "New College." At Winchester, upon the site of the school where he had been taught, the college was begun in 1387, and entered upon March 28th, 1393.

In 1394 Wykeham undertook the re-building of Winchester Cathedral, and by agreement with the prior and convent, he was to re-use the old materials. He employed William Winford as architect, Simon Membury was his surveyor; and John Wayte, one of the monks, acted as controller on the part of the convent. The general character of the building was Norman; and so the central tower and transepts remain, "but the nave," according to Rickman, "has had its piers cased, and the appearance of its walls much altered by the insertion of Perpendicular windows, the addition of Perpendicular buttresses to the North aisle and of a very magnificent West front with three porches of a character very uncommon, the groining of the nave being remarkable for its intricacy and richness." The West front was in point of time and expense the work of Bishop Edynton; but as an artistic invention it is in all probability due to Wykeham. Thus for half a century this eminent man is known to have been engaged in buildings of conspicuous consequence and the highest merit. "The architecture of William of Wykeham," Dr. Ingram observes, "is peculiarly his own. Its characteristics are simplicity, elevation, grandeur, and stability. He built, as he always thought and acted, for posterity. His masonry is distinguished by the soundness of the materials and the judgment displayed in the disposition of them." He exercised a nice discrimination in the treatment of works according to their destination, from the massive boldness of military bastions to the minute finish of ecclesiastical detail. In the quadrangle at New College "a modest simplicity characterises the domestic part, while the gateways seem formed more for strength and security than ostentation or splendour. The hall rises in grandeur as destined for magnificent hospitality, though it by no means pretends to rival the adjoining sanctuary of religion. The only defect in this hall is the flat modern ceiling. It was originally arched with timber-work, and had a louvre or lantern in the centre for the transmission of smoke from the charcoal fire beneath.

I have now perhaps made a sufficient recital to justify an inquiry whether it is not of the nature of certainty that Wykeham, *superior operationum Regis*, must have been the artistic inventor and scientific contriver of Westminster Hall, as opened with royal *éclat* at Christmas, 1398? Thomas Rickman says of it: "The North front of this edifice is one of the earliest as well as best specimens of the Perpendicular style, every distinguishing feature of the style being here exemplified. The interior has Norman walls below; and above the arches are filled with Perpendicular tracery, and from stone corbels of that date spring the ribs of the wood roof—the largest, and, on the whole, the most magnificent wood roof in the kingdom." The masonry exhibits the impressive and simple dignity for which Wykeham is accredited. Here, as at Winchester Cathedral, Norman foundations were retained, the old free stone was worked up, and a new appearance imparted.

* Leeds Castle, about five miles from Maidstone, had a good command of Central Kent, and is now a picturesque group of walls and towers and turrets, rising from a wide and lake-resembling moat. Three islands were separately fortified, and three distinct sieges necessary to its reduction.

An Ancient Structure Doomed.—Astley House, in the High-street of Maidstone, one of the few fine old houses remaining in the town, was advertised to be sold last week, to be pulled down in order to form a site for a post-office. It was built about 1654, and is a remarkably fine specimen of pargetting, now become very rare. The London and Middlesex Archæological Society, as well as private persons, pleaded hard with the Government for the preservation of this fine old building, but, it appears, ineffectually. The interior of the house is interesting, spacious, and sound; the carriage-way gives access to a courtyard, where abundant space might be found for all the Government offices without interfering with the present curious frontage and the chief rooms.

Yorkshire Antiquities.—At the annual meeting of the Durham and Northumberland Architectural and Archæological Society, held at Durham on Tuesday week, it was resolved to make, among other excursions, a two days' visit to the Malton district. Among the objects noted are the Roman station and lodge at Malton, Ryland Abbey, Rievaulx Abbey, Coxwold Church and Shandy Hall, Helmsley Castle, Gilling Castle, Pickering Castle, Kirkham Priory, Old Malton Priory, and the moor tumuli. The date is not announced. Canon Greenwell was appointed President.

Furniture & Decoration.

ITALIAN OPERA, DRURY LANE.

On Saturday last this theatre was reopened by Mr. George Wood for an Italian opera season. Without entering into the question as to whether there is room for more than one opera in the metropolis, there can be no question that the suicidal policy of last season at Covent Garden paved the way for the new undertaking, and that that of the present season seems likely to ensure its success. Few things in the artistic world are more to be regretted than the miserable falling off from the old standard of excellence at the Royal Italian Opera. The appearance of the theatre alone is dispiriting. Dirty, patched, faded, and dingy, it looks like the ghost of its former self. At Drury Lane all is fresh and brilliant. Within the brief space of twelve working days the auditorium has been entirely remodelled. The old floors upon the pit level have been removed, and fresh ones laid upon the original stone paving. Within the portion of the house occupied by the pit during the dramatic season a new tier of boxes has been formed, and the front of the stage has been cut back some five or six feet. The whole of the pit within the line of the boxes is filled with luxuriously-stuffed stall chairs. The floors of the various tiers have been partially levelled, and the box fronts raised to a corresponding extent, the additions being covered in amber tabaret, like the arm-rests. The tiers being unnecessarily deep for the purpose of an opera-house, a wooden corridor is formed out of each at the back, and the remaining portion divided off into private boxes. There are thus three tiers consisting entirely of boxes, above which the dress circle occupies the centre of the house, and private boxes the sides. The entire circle above is filled with cane-seated chairs, forming the amphitheatre stalls. It will be seen that the arrangements of the house are very much the same as when Mr. Mapleson had the theatre for a similar purpose two years ago, but they are in every respect more complete, while the wooden corridors already spoken of have greatly improved the acoustic qualities of the auditorium.

The appearance of the house is quite worthy of the occasion. The white and gold decorations exist as heretofore, but have been revived. The limited time that could be given for the work, and the immense amount that had to be got through, rendered the regilding of the house impossible, but the old gilding now it is cleaned looks remarkably brilliant, considering the wear it has had. A better instance of the superiority of good work over bad could hardly be adduced than the state of this same gilding. Done some eight years or more since (we presume by Mr. Kershaw, who now holds what may be termed the post of decorator in ordinary to the theatre), and cleaned over and over again, it is still for the most part richer in appearance than that on the ceiling, which was done, we believe, by the scene-painters of the Gaiety Theatre, under Mr. Phipps, only last Christmas!

The white and gold decorations having necessarily to be retained, the method of decorative treatment that has been adopted is most judicious. At the old "Her Majesty's Theatre," the boxes were lined with light chintz, which had an excellent effect in combination with the amber curtains and the rich colour of the decorations; and chintz linings were used two years ago, when Mr. Mapleson found a temporary home for his company at Drury Lane. But the absence of colour in the permanent decorations marred the effect, and the house presented a cold and colourless aspect even for the summer. In the present instance blue moiré has been substituted for chintz, and with valuable result. We should be sorry to advocate the use of blue for such

a purpose generally, and we believe its adoption is, in point of fact, quite a novelty. But exceptional cases justify exceptional methods of treatment, and we cannot conceive anything that could better have produced the effect to be desired. The blue is of medium depth, and has in it a peculiar tinge of green that "lights it up," and causes it to harmonise with other colours, particularly with yellow, without, at the same time, destroying the brilliancy of the blue in any way. It thus affords the positive colour required in the house, and forms a singularly good background to the occupants of the boxes. Rich amber satin curtains and valances, and crimson stalls and carpeting, enlivened by the ladies' dresses, make up the rest of the decorative effect, which is unusually handsome and brilliant.

The musical arrangements for the campaign are highly efficient, and the opening performance was most satisfactory. The bill of fare is ample and varied, and comprises more novelties than usual. The whole undertaking savours of judgment, care, and liberality, and will command, we have little doubt, the success that all well-wishers to the lyric drama must desire for it.

We should state that the structural alterations have been made by Messrs. Bracher and Sons, of Great Ormond-street, from the plans of Messrs. Nelson and Harvey, architects, of Whitehall. The furnishing, fitting-up, and decoration were entrusted to Messrs. Green and King, of 100, New Bond-street, the decorators to the late "Her Majesty's Theatre."

THE VAUDEVILLE THEATRE.

THE latest addition to the list of London theatres was opened on the same night as the Drury Lane Opera. In another part of our columns will be found a technical description of the building, and we here propose to notice critically a few of its more salient features. The architect of the theatre is Mr. C. J. Phipps, whose experience in this particular branch of his profession ought by this time to be unusually great. The position and space he had to deal with have evidently been difficulties in his way; but he has for the most part got over them very creditably. The extreme narrowness of the house gives it unavoidably something of a pinched appearance, but the space at command has been well economised, and a good view of the stage is obtained from nearly every seat in the house. It is in the size of the seats that a certain amount of crowding (doubtless unavoidable) is most felt, some of the balcony stalls being so near to those in front of them that the room available for the legs of a man of even average height is decidedly limited. The plan of the house is good. The semicircle of the balcony "opening out to the columns of the proscenium by curves of contrary flexure" (to quote Mr. Phipps' favourite expression) is unobjectionable, coming, as it does, against the straight lines which he has happily given to his proscenium boxes. These are three in number on each side, and form an important feature in the architectural treatment of the auditorium. The large amount of space above the proscenium is somewhat of an eyesore, but it is almost a necessity, in some form or other, of the general planning of the interior.

Passing to the decorations, we find no mention of their author in the programme, but we believe we are right in stating that they are the work of Mr. George Gordon, the scenic artist of the Gaiety theatre, to whom is also due the act-drop of the Vaudeville. Unquestionably the decorations bear strong evidence of the scene-painter's hand. They have been stated by some of our contemporaries to be in the Romanesque style, but we should rather say they were in the "Gaiety" style. They bear, in point of fact, the strongest family likeness to those of the Gaiety Restaurant; and we might almost repeat the very criticism that we passed upon these latter last November, in utter ignorance of their authorship. Mr. Phipps has in a manner constituted himself a champion of coloured decoration in theatres, and for this a debt of gratitude is due from those who admire polychromatic effect; but in so doing he lays himself open to severer criticism than others. We are bound to state our conviction that the decoration of the Vaudeville theatre is not successful. It is not for us to enter into the question as to whether Mr. Phipps or Mr. Gordon has been the source of inspiration, but we find, in a greater or less degree, the same faults that characterise the Gaiety theatre and restaurant. The principal of these are want of repose, and the absence of a sense of harmony in colour. In entering the Vaudeville theatre after leaving Drury Lane Opera these defects were more peculiarly striking. At the one house an unbroken sweep of amber, gold, white, and blue upon a base of crimson: at the other, no two things of the same colour. Mr. Phipps seems, since his connection with the Gaiety, to have imbibed some of the spirit of its predecessor, the Strand Music Hall, a result to be deplored, considering the opportunities afforded to him.

Passing a little more into detail, we may notice that the treatment of the ceiling is good. It consists of radiating compartments, filled with white ornaments upon a rich light blue ground. The same tone of blue, a trifle darker, is repeated below in a kind of frieze, which is continued right round the house, and so forms the gallery front. But the strength of colour practicable upon a ceiling with a sun light is by no means compatible with the direct light falling upon a vertical surface, and the effect of the blue in this position is, in consequence, unpleasantly garish, although the ornament is well drawn and otherwise effective. The large coved space above the proscenium is divided out into a number of rectangular panels filled with ornaments of alternating design. There is much that is good about this portion of the work, though there is some of the restlessness of which we have spoken, and which is due in a great degree to the spotty character of the designs, and to injudicious use of the gold. The spaces contiguous on each side and above the proscenium boxes are treated in a manner altogether different, and very unsatisfactory. The ornaments are bad both in conception and drawing, and are the worst piece of decoration in the theatre. We are the more surprised at this, as the treatment of the balcony front (evidently by the same hand) is particularly good, and by far the most artistic in the building. Oblong panels, containing arabesques upon gold grounds, alternate with circles of marone, bearing devices in a light tone of colour, and the whole effect is quiet, rich, and soft. Were the whole theatre treated in the same key of colour, we should have had little but congratulation to offer.

An important feature of the decorations are the six figure-subjects from the "Tempest" and the "Midsummer Night's Dream," in lunettes above the proscenium boxes. These paintings are the work of Mr. W. Phillips, and are excellent in intention and in the method of treatment adopted, but further praise we cannot give them, both the drawing and the execution being very inferior. The act drop consists of a charming classical landscape, surrounded by arabesque borders, and so far reflects the highest credit on Mr. George Gordon's taste and skill as a scenic artist. But what could have induced him to make the marginal curtains of that bilious-coloured canary yellow, and who is responsible for the contiguous draperies of the private boxes? These boxes are lined with a crimson and gold paper, so treated as to produce at a little distance a most agreeable tone of warm brown. Had this been continued through the house, instead of a common crimson paper in the boxes and pit, with green paint in the balcony, cutting the house in half, the effect would have been harmonious and pleasant. But the curtains and valances are of a deep orange tone—a colour unpleasing in itself, in discord with everything else in the house, and especially so with the canary-coloured draperies of the act drop. When we add that the orange valances are trimmed with a fringe consisting of yellow, blue, and red, our readers may be left to imagine the result. But we have yet a greater sin to denounce. The proscenium curtain is of the brightest possible blue consistent with its depth of colour. We have thus the over-bright turquoise blue of the gallery front and frieze, the neutral blue background of the figure subjects, and this mass of what we may term the drapers' fashionable blue! The use of blue in decoration is proverbially a matter of extreme difficulty, but we have seldom witnessed so unwise an experiment, or winced under so painful a failure.

Building Intelligence.

CHURCHES AND CHAPELS.

DEWSBURY.—On the 16th inst., the corner stone of a Congregational Mission Room, in connection with Ebenezer Chapel, Dewsbury, was laid. The structure will be in the Gothic style of architecture, plainly treated. The building is to accommodate 250 worshippers, and cost £500. Messrs. W. and D. Thornton are the architects.

KEIGHLEY.—On Easter Eve the foundation stone of a new chapel and schools in connection with the Congregational body was laid at Utley, near Keighley. The chapel proposed to be built will be in exterior appearance of the Decorated Gothic style of architecture. It will be 58ft. long, 32ft. wide, and 40ft. high to the ridge. Underneath there will be the minister's vestry, accessible from a lobby communicating by a door with the chapel on the same level. The schoolroom will accommodate 250 children, and the chapel will seat about 400 people. The total outlay will be about £2300. The architect of the building is Mr. George Smith, of Saltaire.

LEIGH.—The foundation stone of a new Wesleyan Chapel was laid at Leigh, Lancashire, on Friday last. The building will be Early French Gothic in style, and will have a tower and spire rising to the height of 150ft. Accommodation will be provided for 960 persons, at a cost (exclusive of site), of £9000. Mr. C. O. Ellison, of Liverpool, is the architect; Messrs. Burroughs and Son, of Liverpool, are the contractors.

NETHER WHITACRE.—The ancient structure of S. Giles, Nether Whitacre—previously in a very dilapidated condition—was reopened for divine worship on Easter Tuesday, after undergoing thorough restoration. The edifice consists of nave, chancel, and tower, and the work of restoration includes the removal of a west gallery, and the opening out of the tower arch, the stonework being cleared of the whitewash. Open seats, chiefly of pitch-pine, stained and varnished, have been substituted for the old "horse boxes," and the chancel and nave are paved with encaustic tiles. The south wall of the nave, formerly faced with bricks, has been cased with dressed stone work, as also the entrance to the porch. The interior walls are replastered, and the stucco on the eastern wall of the chancel and other parts of the structure has been cleaned off, and the joints of the rubble work pointed. The Jennens chapel, situated on the north side of the chancel, has been enlarged, and a new vestry added. The restoration has been carried out from the plans and under the superintendence of Mr. Robert Jennings, architect, Atherstone.

WIKE.—Last week the foundation stone of a new Wesleyan Chapel was laid at Wike, Yorkshire. The chapel, from the designs of Messrs. Andrews, Son, and Pepper, architects, Bradford, will be in the Gothic style, 53ft. long by 25ft. wide, with an internal extreme height of about 30ft. It is estimated to cost about £700, inclusive of land.

BUILDINGS.

CAMBRIDGE.—During the past two years extensive alterations have been going on at the

Cambridgeshire County Gaol, at a cost of about £8000. The architect for all the alterations has been Mr. W. M. Fawcett; the clerk of the works, Mr. Edwin Bays; and the builders, Messrs. Bell and Sons, all of Cambridge.

Kersley.—Extensive alterations have recently been made to the Farnworth Brewery, Kersley. The erection of the buildings, together with all the carpentry, has been carried out by Messrs. Coope Bros., joiners and builders, of Farnworth, under the superintendence of Mr. John Garrard, jun., architect, of Clamerclough, Kersley.

The Vaudeville Theatre.—Last Saturday night witnessed the opening of the little theatre which has been erected in the Strand upon the site of the defunct Bentinck Club, a few doors from the Adelphi. The architect of the structure has been Mr. C. J. Phipps, F.S.A., a gentleman who has had much experience in this style of work, having designed the Gaiety, the Queen's, and seven other theatres during the last few years. The new theatre, which will comfortably seat 1000 persons, and in addition afford a considerable amount of standing room, is in every respect entitled to the claim of novelty. As might be expected, the principal entrance is in the Strand, from which a hall sufficiently spacious leads to the stalls, the balcony and boxes being approached by a staircase 6ft. in width. The approach to the pit is obtained by means of another corridor from the Strand, whilst the gallery entrance is situated in Lumley-court. It may here be mentioned that the building extends northwards almost to Maiden-lane, and to Lumley-court towards the east. The interior of the theatre is constituted as follows:—A balcony, the front forming a semi-circle, which approaches the columns of the proscenium by curves of a contrary flexure. The chief circle tier is situated behind this and at a higher level, the front of the upper circle being on the same vertical line as the division between the balcony and the dress circle; a commodious gallery backs the upper circle. On either side, between the balcony and the stage, and opening on the grand tier, are three private boxes, divided by pillars, having enriched capitals, and surmounted by semicircular arches, each containing a figure subject. On the pit level, on either side, are two more private boxes, those on the left-hand, facing the stage, being set apart for the royal family, and so arranged as to admit of being thrown into one large box, approached from the stalls' corridor. The stalls are approached from both sides, there being another corridor on the other side of the house. The stalls contain six rows of arm-chairs, the pit is spacious, and there are three rows of arm-chairs in the balcony, four rows of seats in the dress circle, two more private boxes behind same, two rows of upper circle, and a commodious gallery. As regards the other arrangements of the house, opening out from the first landing of the grand staircase is a refreshment saloon, with cloak-rooms contiguous, for both ladies and gentlemen; above this, and occupying the frontage towards the Strand, are rooms for the management offices, wardrobe making rooms, and a spacious refreshment saloon for the gallery. The lighting of the auditory is by one of Strode's sun-burners in the centre of the ceiling. The ventilation has been specially considered, there being extracting flues in the side walls of every tier near the ceiling. An evil which exists in many theatres, caused by the approximation of the floor of the boxes to the pit, has been carefully guarded against, the ceiling over the pit being carried up to a height of 10 feet. The stage, too, has been the subject of much care, and is well adapted for the varied performances of the house; it is 30ft. 6in. in depth from the float lights to the back wall, with a dock for stowing scenery in addition. The width between walls is 41ft., the stage opening 22ft. wide, and the height above is sufficient to take up scenery out of sight. The stage floor is fitted up with machinery of the usual elaborate description. The footlights are those which have been introduced by Mr. Phipps in several of his later theatres, and manufactured for him by Messrs. Strode, the lights being entirely out of the sight of the audience, and burning downwards, the produce of the combustion being taken away in a large iron cylinder running parallel with the front of the stage, and carried up in a flue in the main wall. The coloured decorations of the theatre have been executed by Mr. George Gordon, and are principally on the flat, there being no raised ornaments on the ceiling' or box fronts with the exception of the upper and lower mouldings. The seats in the stalls and balcony are covered in maroon colour, the woodwork is ebonised, and was worked by Messrs. Wodman of Bath, from the architect's registered designs. The general builder's work has been executed by Mr. Hyde. The act drop has been designed and painted by Mr. Gordon, the figures in the foreground being by Alfred Thompson, Esq.

Westhoughton.—The foundation stone of new Congregational schools was laid on Friday last at Westhoughton. The schools will adjoin the chapel of the denomination, and will be constructed of brick, at an estimated cost of £1050. Mr. James Atherton is the architect, Messrs. Dickinson and Watkinson being the contractors.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

Received.—B. H. & Co.—W. Y.—J. H.—J. N. P.—N. W.—C. T.—J. H. M.— C. & Co.—Rev. E. H.—J. T.—J. M. J.—G. H. G.—J. B. T.—J. H.—A New Subscriber.—J. H. R.—A Learner.—A Competitor.—J. H. B.—E. C. D.—W. Sutherland, with MS.—T. Cox.—S. H.

A Constant Subscriber.—The new Law Court competition was not an open one. Twelve architects were selected.

"The Sender of the Brick."—You feel mortified because baffled.

H. J. Snell.—With description of old house, Plymouth.

P. & J. Parker.—Hardly suitable for Building News.

J. R. Walker.—Answered by letter.

J. W. B.—Send the drawing.

Clerk of Works.—Longman's cheap Dictionary of Architecture.

Correspondence.

A CRITICISED CRITIC.

(To the Editor of The Building News.)

Sir,—I find in the last number of your paper two letters criticising my review of Dr. P. F. Krell's "History of the Doric Style." "P. E. M." kindly acknowledges "that I have been diligently reading up the subject of Grecian Architecture." I wish I could say the same of him. He obstinately persists in his ignorance, and again repeats the utterly unwarrantable assertion that I invented the term "Attic style." In lecturing on Greek art at the South Kensington Museum, about three months ago, I used some of Mr. Wornum's diagrams, and on one of them I showed the students the outlines of a base, shaft, and capital in the Ionic style put side by side with the base, shaft, and capital of a column in the Attic style. Has Mr. Wornum also drawn for the students of the South Kensington Museum a mere fanciful representation of the two styles? As "P. E. M." does not read up Grecian architecture, I take the trouble to point out to him the differences between the Ionic and Attic style.

1. The base of the column in the Attic style is deprived of its particular plinth.

2. Instead of it the double contraction is transformed into a simple one, which is united with the common support by means of a strong circular ovolo. The Attic base is formed of a sharply contracted fluting between two ovolos; yet in this limited space the law of tapering of the shaft is expressed, as it were, on a small scale, for the lower ovolo projects further, and is more strongly formed than the upper one.

3. Though the shaft of the column was essentially the same as in the pure Ionic style, it was more slender in proportion.

4. The capital expresses a more energetic life by the greater projection of its powerfully-formed volutes.

5. The frieze is considerably higher than in the Ionic style.

6. The corona is without the *dentated* ornament ,instead of which the projecting plinth is strongly undercut along its whole length, so that the edge in front overhangs the crowning member of the frieze. These are the principal, besides many secondary distinctions between the Attic and Ionic style. So much for "P. E. M."

Concerning my "Humble Disciple," I have very little cause to be proud of him. He must have neither listened attentively to my lectures nor have read much about art, else he would know that the honour of classifying products of art according to the three principal ethnological divisions of mankind does not belong to me, but that this "momentous discovery," as he calls it, has been made by Mr. James Fergusson, when he wrote the following passage—"Show me a building and I will tell you that it was a *Turanian* who made it." The greatest art historian of England attributes all important architectural products to this special race, the square-headed Mongols. I did not laugh at this broad assertion; I did not sit down in all haste to pen an article in the style of a punster to the scientific periodical "Punch and Judy;" but knowing from Locke "that general observations drawn from particulars are the jewels of knowledge," I tried to verify Mr. James Fergusson's generalisation, and was enabled, after a careful collection of particular facts, to come to this conclusion: that the ethnological basis is the safest for the student of art history. The blacks have no talent for the higher development of art. The Turanians generally construct quaint, irregular buildings, and only the Aryans are capable of a progressive development in all the branches of art and science. To disprove this theory, my "Humble Disciple" ought to have produced a list of known palaces, temples, statues and paintings made by Negroes. He ought to have shown that Turanians were the builders of the Parthenon and the Gothic cathedrals; that the rock-hewn temples of India, the marvellous constructions of Egypt, the Roman amphitheatres, baths, viaducts and aqueducts, the Byzantine and Romanesque churches, the Renaissance palaces, our modern railroads, tunnels, and subways have *not* been made by Aryans. All that has been said against me shows that the study of art history has been sadly neglected even by those who assume the right "to criticise a critic." I cannot but express my regret that young men who devote themselves to one of the liberal arts—architecture—neglect all *higher training*, and think themselves architects if they can draw up estimates, calculate the price of bricks and planks, make plans of cottages, thin-walled cheap dwelling houses, porticos without taste, pillars without style, and ornaments without sense. The effect of this cause is that over-bearing, rule-of-thumb pride, with which men like "P. E. M." look upon everyone as an intruder who propounds new theories, when he tries to make them acquainted with old ones; invents fanciful statements, when he says what everybody ought to know, and terrifies them to the core of their hearts, because they suppose he could not calculate what a house would cost if bricks were so much the thousand, but wishes them to know a little more than they do. My province is not to teach the technical details of any particular branch of art, but that of a professor of history, who has to raise the standard of the knowledge of the students and to make them acquainted with the general course of the development of art amongst all nations.—I am, Sir, &c. G. G. Zerffi.

MODERN STAINED GLASS IN GLASGOW CATHEDRAL.

Sir,—That Mr. Seddon should feel strongly and express himself plainly on the subject of the Munich glass is very excusable. When so much effort is made by some to make known the true principles of art, it is very provoking that, as in the case of Glasgow Cathedral, not only is a good opportunity lost for right teaching, but made the means for disseminating bad taste.

Mr. David Thomson asks for corroborative testimony to Mr. Seddon's statements. I venture to offer him such:—It is a fundamental and common sense principle of art that the application of any material shall be in a way consistent with its distinguishing characteristics. This, in the case of glass, is transparency, hence the rule that there should be no shading, or only such as would be required to emphasise the outline. The material, too, is not well adapted to display perspective effects, and such should be eschewed, and this is agreeable with another law, that in pictorial decorative art the subject represented should be on one plane. That these are true principles is proved by the practice of the old artists during the best period of Gothic architecture, the 13th and 14th centuries, and by the opinions of those in the present day who have made Mediæval art their special study, such as Pugin, Butterfield, Street, Pearson, Burges, Bodley, &c., and by the practice of the principal manufacturers, Hardman and Co., Clayton and Bell, Morris, Marshall and Co., &c. What was the nature of Mr. Winston's advice I know not,

but in his work on "Glass Painting" he in several passages condemns the Munich glass. I have not seen the Glasgow windows, but was shown specimens at Munich, and saw a collection of such things with other curiosities in the Museum at Cologne, and in contrast to such have beheld with delight the noble works of olden time at home and abroad. Such glass as that in the Duomo, at Florence, one's memory clings to with delight as the consummation of art. Of the modern Munich glass I think, with Mr. Seddon, it is simply meretricious trash—prostituted talent. It may be immensely pleasing to the vulgar mind, low art, unfortunately, always is.—I am, Sir, &c.,

M.

EXTERNAL FACINGS AND DRESSINGS.

Sir,—The need of a facing material for town buildings, smooth, but unpolished, was the subject of a conversation I lately had with a member of the well known firm of Doulton, and which resulted in his calculating at what price terra-cotta bricks could be made. The price named was £5 to £6 per thousand. They could be buff or red, and either of the size of common bricks, or what would perhaps be better, 18″ × 9″. I think here we have indubitably the desideratum, and I much wonder such bricks have not yet come into general use, since the extra cost on a frontage would be but small. The use of such facing would immensely improve the appearance of our streets.—I am, Sir, &c.,

Philip E. Masey.

GLAZED BRICKS.

Sir,—Once more permit us to trespass on your very useful columns to reply to "J. C.," particularly to give him and your readers some information on glazed bricks. He appears to consider it beyond all question that, though well glazed, the bricks would require periodical washing. Now, in reply to this, we beg to inform him, and all who may feel an interest in this very important question of cleanliness of street fronts in large cities, in no one instance, after eleven years' trial, has it been found to be necessary, nor to our knowledge has it ever been done. The bricks in the instance to which I have before referred—namely, the north wall of the house belonging to G. L. Fuller, Esq., C.E., 10, Park Villas West, Albany-street, Regent's Park, have never been cleaned, and are looking in excellent condition. To use the words of that gentleman, they have admirably fulfilled the conditions expected from them, and are perfectly satisfactory. Now, Sir, there are the bricks; after eleven years they look as well or better than when first put up, and have never been washed. As to the opinion of the glazed surface, architecturally considered, it is quite evident there are abundant instances of buildings so ornamented in Hindoostan, China, Persia, &c., now many hundreds of years old (which, perhaps, Mr. Ruskin has not seen), and which is a sufficient proof of their being highly approved in those very sunny countries. See Mr. Connybeare's articles in the *Fortnightly Review* of November, 1867, and The Building News, December 6, 1867, where he speaks of them in admiration—and his opinion is highly important in such matters. He also quotes Mr. Fergusson, whose remarks are very decidedly in favour of glazed surfaces for exterior use. It is quite as likely as not that after a while our difficulty would be not that of making them lustrous, but that of not making them lustrous enough. Whoever has seen the examples referred to by Mr. Connybeare has been struck with admiration of those buildings, in which glazed surfaces form so prominent a feature. In our last we named a price, but this depends materially upon the demand. We need scarcely add that there is ample opportunity for decorative effect both in colours and mouldings.

The Architectural Pottery Co.

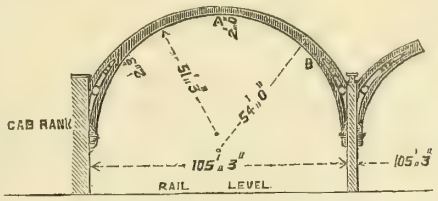
IGHTHAM OR EIGHTHAM?

Sir,—I had not ventured to send you my former communication without a due consideration of its *pros* and *cons*. Chiswick Ait is well known to me, and its analogy very striking. It is because the Mote House island seems too inconsiderable to justify us in attributing to its insular position the origin of a name applied to the whole neighbouring township that I am disposed to maintain my ground. We speak of the Mote House *at* Ightham; but if we should read Aitham, it follows that the private dwelling would be Aitham *itself*—its alpha and its omega. It is, however, obvious that there is not, on the little island in question, space for the township that we call Ightham; so, looking to the mainland for the township we are in search of, we light upon seven other little places, making up the eight hams commemorated in the joint name. It cannot be shown that this joint name ever attached to the island *alone*.—I am, &c.,

A. Hall.

RENEWAL OF KING'S CROSS PASSENGER STATION ROOF.

Sir,—In your last number (April 15) a correspondent, in a letter signed "The Writer of the Article Referred To," falls into an error in giving the depth of the arched ribs of the above-named roof.



The outer and inner flanges of the ribs are not concentric, as shown in his sketch, but struck from two different centres of 51′ 3″ and 54′ 0″ respectively; the depth over all at crown (marked A on sketch) being 2′ 0″, and just above spandrel fillings (marked B) 2′ 3″.

R. M. Bancroft, Member Civil and Mechanical Engineers' Society.

Note.—For further details of this roof see paper read before Civil and Mechanical Engineers' Society, reported on p. 465, Vol. XVII. of The Building News.

CONCRETE BUILDINGS.

Sir,—I am glad a correspondent promises to give your readers the result of his experience in concrete building. I know of no subject connected with the building trade that is more likely at the present time to be of general interest. I think if those of your subscribers who have erected concrete buildings, or who are living in concrete houses, were to give in your columns a statement of plain facts connected therewith, some valuable information might be elicited. I have been some time engaged in erecting concrete buildings, and have been often surprised at the result of different experiments I have made, and which I should be glad to give the readers of The Building News.

I find that nearly all who have written on the subject have different opinions as to the cost, proportion of materials, size of same method of building, &c; and it would be well if these and other points could be determined.

W. W.

BRITISH CARPENTRY.

Sir,—Mr. Thomas Morris, in his article on "British Carpentry," in The Building News of last week, has made an egregious mistake in his reference to the chancel of Minster Church (Thanet). As the internal roof is groined in chalk, with stone moulded ribs, I need scarcely say the sketch is totally incorrect, and there is no part of the church at all like it. Living as I do within a few miles of Minster, I may be supposed to know this interesting building well; but having been, jointly with my father, architect of the restoration of all the church except the constructional parts of the chancel, I can speak with the greater certainty.—I am, &c.,

Jas. W. Smith, Waterloo Villa, Ramsgate.

Intercommunication.

QUESTIONS.

[1832.]—SPECIFICATION OF GOTHIC BUILDING.—Will some one be good enough to point out a book published within the last year or two containing a modern specification of a first-class Gothic building—either a mansion, church, club-house, or bank, and state the name of the publisher?—J. E. B.

[1833.]—THE EARTH'S SPHERICITY.—There are persons who still believe that the earth is flat, and not round. Some time ago a Mr. H. bet a Mr. W. £500 that if three discs were placed three miles apart at precisely the same height above a piece of still water they would be in a straight line. On the experiment being tried, the referees decided that the farthest disc was below the line of sight directed by the nearest and centre discs, that in consequence the earth was round and and not flat, and that Mr. W. had won the bet. Would any correspondent of The Building News kindly inform me how much the line of sight directed by the nearest and centre discs was above the farthest disc?—Inquirer.

[1834.]—REMOVING LIME FROM TILES.—Can you or any of your readers oblige me with a recipe for removing plaster lime from a tile floor on which it has become encrusted by the carelessness of plasterers?—D.

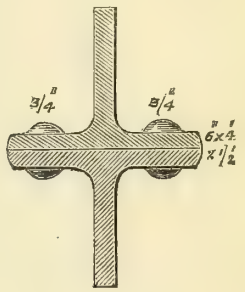
[1835.]—DRY ROT.—Will you or any of your readers kindly inform me through your columns the cause of dry rot, its prevention and cure, as I have now a house to repair which is being destroyed by it?—C. F.

[1836.]—GOVERNMENT HOUSE, OTTAWA.—Will you or one of your readers kindly inform me what is the name of the architect for the new Government House at Ottawa, Canada?—T. M.

REPLIES.

[1805.]—PLUMBERS' WORK.—"W. W.," in answering the questions put by "Zeff" a few weeks ago, states, No. 2, that "the lead of one sheet laps about half way over the roll, and the other passes right over the whole, and returns again on to the flat, and is then *soldered down*." This alleged soldering is quite contrary to the practice, and would entirely defeat the object attained by the introduction of the rolls, which is to obtain a watertight joint that will at the same time keep out wet and allow of free expansion of the lead, as experience has shown that the lead-work should be laid so as to allow of such free expansion and contraction, and all soldered joints should be avoided in roof-work. Close copper nailing is not necessary at the lap of lead, and should only be used at sink margins, skylight curbs, thresholds, and other similar positions where the edges of lead-work may be subject to wear and being turned up. Soldered dots are not used as stated at the lapping of lead sheets covering a dormer, but to cover the brass screws which are used to secure the lead sheets covering the sides of any sharply-sloped roof or dormer. If any joints are required in the width of the lead they may be formed by soldered seams, but all such should be as far as possible avoided, and lapped joints used when practicable.—G. L.

[1823.]—CAST-IRON STANCHIONS.—Your correspondent will find very few practical men to concur in the advisability of employing so treacherous a material as cast iron to carry a load of 30 tons, with a length or height of 12ft. Enclosed is a section of two wrought-iron tee-irons rivetted together with 2 rivets ¾″ in diameter, which would answer the purpose; but



I should never think of using cast iron in the situation in question. Wrought iron is so much more reliable than cast iron that where there is a long length of it combined with a heavy load no one would hesitate to give it the preference. If cast iron be used, it should be in the shape of a hollow pillar, the strength of which can be calculated from Mr. Hodgkinson's formula.—A. K.

STAINED GLASS.

A Yorkshire Memorial.—At Harrogate, on Monday last, a memorial window, lately erected in the Royal Pump-room, Harrogate, was unveiled. The erection of the window by public subscription was for a memorial to two members of the Slingsby family—viz., Sir William Slingsby, who some 200 years ago first discovered the mineral waters at Harrogate, and to Sir Charles Slingsby, master of the York and Ainsty Hunt, who was drowned at the lamentable catastrophe at Newby last year. The window is of three lights, the centre piece representing the troubling of the waters of the pool of Siloam, and in the side lights are the escutcheons of Sir William and Sir Charles Slingsby respectively. It is from the establishment of Messrs. J. Pilkington and Sons, S. Helen's Glass Works, near Liverpool.

STATUES, MEMORIALS, &c.

Wishaw.—A monument has been erected in the Cambusnethan Old Burying Ground, Wishaw, to the memory of the late Lord Belhaven. It is a parallelogram about 38ft. in height. On each corner of the wall on which the roof rests is placed a sphinx, the spaces between which on the sides are filled with a row of lions' heads; in the pediments above the façade and the back wall are the arms of the Belhaven family. Below the sphinxes and lions' heads wreaths of flowers surround the building, the rest of the walls to the foundation being relieved by plain massive mouldings, which enclose also the inscriptions. The roof itself is arched, of solid masonry, and is cut in imitation of the flags with which many old churches were roofed, such as may now be seen on the roof of what remains of Bothwell Old Church. Mr. David Thomson, of Glasgow, was the architect; Messrs. Mossman, Glasgow, the sculptors; and Mr. Watt, of Wishaw, the builder.

The Wellington Monument.—This monument still lingers in the Civil Service Estimates. The vote this Session is to be £994, leaving £1100 to be voted hereafter to complete the £20,000, the amount of the original estimate. The estimate was £14,000 for the monument itself, to be erected in S. Paul's Cathedral; £4840 for *relievi* for the panels of the walls of the chapel in which the monument is to be placed; and £1160 for decoration of the chapel, architect's commission, and contingencies.

LAND AND BUILDING SOCIETY.

Birmingham Second Freeholders' Building Society.—The seventeenth annual meeting of this society was held at the offices, Waterloo-street, on Tuesday week. The report stated that the result of the society's operations during the past year had fully realised their most favourable anticipations. Although much anxiety and distrust still exist, the confidence of the investing public in this society continues unimpaired, the income having been £13,553 10s. 8d., thus increasing the aggregate receipts to £198,505 15s. 56 new members have been enrolled, subscribing for 122 new shares. Upwards of £6500 has been advanced upon mortgage, and in every instance an ample margin has been secured. The withdrawing members have been promptly paid, and every engagement satisfactorily met. The financial statement shows that the profit, including the balance brought forward, is £3730 11s. 8d. After payment of interest to depositors, and placing to the credit of investing members compound interest at the rate of 5 per cent. per annum—in accordance with the resolution adopted at the last annual meeting—as

well as discharging all management and incidental expenses, the balance of the reserve and deferred premium fund amounts to £1953 13s. 5d.; being an increase of nearly £600 on the preceding year.

LEGAL.

Metropolitan Board of Works v. Abbott. Lambeth Court, April 2nd, 1870. (Before Mr. Woolrych).—In this case Mr. Abbott, a builder, was summoned for erecting a dwelling-house in contravention of the 98th section of the Metropolis Management Act, 1862, by not leaving in front of such house a road of 20ft. in width to the crown or centre. The house in question was situated at the corner of Blewitt-street and Pleasant-row, at Walworth, and fronted on Blewitt-street, which was a new street formed by the sanction of the Board to a width of 40ft. Pleasant-row is an old way less than 40ft. wide. Since the erection of the house in question other buildings had been erected in Pleasant-row, which brought that street partly under the jurisdiction of the Board, who had required the same to be widened in front of the new buildings. The contention of the Board was that the house at the corner of Blewitt-street should have been set back so as to give the full statutory width to Pleasant-row in case that row was at any time afterwards, as in fact it was subsequently, brought under the jurisdiction of the Board. This contention is a most serious consequence to owners and builders of property, as it would place those dealing with properties at the corners of old streets at the peril at any time within six months of the discovery of the objection to have a considerable portion of their property confiscated and their buildings pulled down in consequence of the acts of other owners of property in the same street.—Mr. Reginald Ward appeared as assistant solicitor to the Metropolitan Board of Works in support of the summons, and Mr. Rooks, of the firm of Rooks, Kenrick, and Harston, for the defendant. The magistrate, after hearing the evidence and carefully examining the plans, decided that there had been no offence under the Act, and that the house having been built fronting on Blewitt-street within the lines shown on the approved plan, the defendant had a right so to erect this house even though the result would be that the side street on which the house flanked would still be left as an old street of lesser width than 40ft.—Summons dismissed.

Sir Robert Peel, Bart., v. the Metropolitan Board of Works.—This case was tried before Baron Bramwell, in London, when a verdict was found for the plaintiff, damages £5778, with interest, the defendants having leave reserved to them to move on points of law. The action was on an award made by an umpire appointed under the provisions of the Thames Embankment Act, to recover a sum of £5335 awarded as compensation for the "injuriously affecting" of the plaintiff's house in Whitehall-gardens by the defendants in the course of works performed by them under the powers of their Act of Parliament. The award was as to two heads of injury. The one was the temporary injury to the occupation of the house and property during the progress of the works; and the other the permanent injury to the property by the removal of certain steps and access to the river and otherwise. The jury found, in answer to questions left to them by the learned Baron—1, that there was a substantial nuisance to the occupation from the vibration, noise, and dust; 2, that this nuisance necessarily arose from the proper and practical execution of the works; 3, that the umpire awarded nothing under this head for the annoyance caused by the workmen, &c. And with regard to the permanent damage, the jury found that there was injury from the loss of the steps and access to the river *per se;* that there was structural injury by cracks caused by pumping and vibration jointly; also that the additional garden added to the old one, and new access to the river, would be sufficient compensation for the loss of those taken away; and, lastly, that the umpire included under this head the loss of privacy and other amenities. Mr. Hawkins contended that the heads of damage were not the subject of compensation; that under the Thames Embankment Act the plaintiff had added the reclaimed slip of land to his premises, and the jury had found that with the enlarged gardens the premises were as agreeable as they were before, and that there was no permanent depreciation; that the loss of amenities, even if supported, was not a head of compensation, as the value of the premises was not thereby depreciated. The Court granted a rule.

Our Office Table.

A New System of Ventilation.—At the last meeting of the Royal Scottish Society of Arts, a paper by Mr. Robert Aytoun, W.S., on a new method for warming and ventilating buildings, was read. The paper stated that the air is introduced from the windward side of the house, and passes through a warming apartment into the lobbies and staircases, which conduct it into every room of the house. Means are provided by which the air of each room is discharged to the leeward side. The air, therefore, in its whole course through the house is impelled by the never failing action of thorough draught. When this system of warming and ventilating is applied to dwelling houses, the author is confident that no fires will be required in the sitting and bed rooms, owing to the rapid transmission of warm air through the rooms. In the course of a discussion on the paper, Mr. J. D. Morrison, surgeon-dentist, to whom was awarded the Highland and Agricultural Society's medal for ventilating apparatus, said he was glad Mr. Aytoun had brought up the subject of ventilation, and remarked that, although at the meeting of social science the mere mention of ventilation was followed by a general rush to the door, the Danish Government had offered a prize for the best essay on the subject. He was anxious that Mr. Aytoun's paper should have full consideration by a committee, as there was greatly more in ventilation than most people imagined. He had in contemplation inviting the heads of the medical, engineering, and architectural professions to witness the application of ventilating machinery to the cure of disease.

The Peabody Trust.—The Vestry of S. George the Martyr, Southwark, has resolved to send a deputation to the Trustees of the Peabody Fund, to press upon their notice the very great desirability—nay, the urgent necessity—of at least some portion of the funds given by Mr. Peabody being spent in the erection of buildings for the very poorest classes and in the poorest localities. The vestry deprecates the acquirement by the trustees of very valuable sites (such as that of the Magdalen Hospital, in Blackfriars-road), which only enhance the rents of the buildings erected upon them. Tenements letting at cheaper rents than those hitherto erected are required, and the S. George's Vestry is of opinion (and justly so, we think), that the Peabody trustees ought, in virtue of their trust, to take some steps to meet this want. The very poor cannot pay 5s., 7s., or 8s. per week for rent.

Earl de Grey on Art Exhibitions.—An art exhibition—embracing specimens of the old masters, several fine works of the British school, a very complete collection of pre-historic remains, contributed by the Rev. Canon Greenwell, and the Rev. W. C. Lucas, and several cases from the South Kensington Loan Collection—was opened on Monday, at Ripon, by Earl de Grey. The pre-historic remains which form the principal feature have never before been presented for public inspection, and the exhibition will remain open for about two months. Earl de Grey delivered an inaugural address, in which he pointed out the importaace of such exhibitions, as tending not only to exercise a good effect on the artist and the artisan, but to educate the eye and improve the taste of the public generally. The Science and Art Department, over which he presided, was, he said, doing a great work throughout the country, by contributing objects of interest to provincial exhibitions, and educating art teachers, who dispersed themselves over the length and breadth of the land.

Death of Mr. John Wood.—The death is announced of Mr. John Wood, an artist of great ability. For very many years, until incapacitated by illness, he was a constant exhibitor on the walls of the Royal Academy, where, as a student, he gained several medals, among them the highest honour bestowed, the gold medal in 1825, for his picture of "Joseph Expounding the Dreams of Pharaoh's Chief Butler and Baker." His numerous works displayed his great abilities, and comprised portraits of Stothard, the painter of the "Pilgrimage to Canterbury," Lake Price, Esq., Sir Charles Locock, Sir Edward Barnes, Sir Philip Durham, in the Army and Navy Club, together with his larger and more important works—the altar-piece of the "Ascension," in St. James's Church, Bermondsey, and the "Baptism of our Saviour in the Jordan," which was chosen in public competition by the late Prince Consort as worthy of the £1000 prize offered by Mr. Bell, member of the Baptist Society. He was born on the 29th June, 1801, and after a life dignified by perseverance and kindness of heart, died at the residence he had occupied for upwards of 40 years, on Tuesday evening, the 19th inst.

Chips.

The Paris Academy of the Fine Arts has just awarded to M. Oudiné the prize in the section of architecture given by M. Achille le Clerc for the best design of a lighthouse to be erected at the entrance to the Suez Canal.

It is proposed to erect a memorial of the late Mr. Henry Berkeley, who for so many years represented Bristol in Parliament. A statue is suggested.

Cerne Abbas Church, Dorsetshire, was re-opened yesterday (Thursday) after restoration.

The restoration of the south aisle of the parish church of Great Yarmouth is now completed, and will be inaugurated on Thursday next.

Sir William Armstrong has presented £2500 to the Newcastle Infirmary, towards carrying out the erection of a new wing to the building.

The harbour of Torquay, which has been for some years in course of construction, chiefly with the view to accommodate yachts, will be opened during the summer.

The Belfast and North of Ireland Exhibition (in connection with the Workmen's International Exhibition), opens for ten days on Tuesday, May 17. Medals and certificates of merit will be awarded at the close of the Exhibition.

Shoreditch Church is now undergoing extensive alterations. The pews are being removed, and will be replaced by modern seats; the galleries are being removed, and the windows will be altered.

A new coach factory, on an extensive scale, has been erected for Mr. Arthur Andrews, Southampton, by Brinton and Bone, builders, from designs of Messrs. Guillaume and Parmenter, architects.

Madame Ratazzi, the wife of the Italian Minister, has just published an archæological work on Nice, Monaco, and the neighbouring coast.

TIMBER TRADE REVIEW.

The following circular has been issued by Churchill and Sims, of 29, Clement's-lane, bearing date April, 1870:—

We have a very moderate stock of Baltic and colonial wood now remaining at the public docks. The deliveries during March having been as large as those of the same month in 1868 and 1869, by our present return the disparity of the relative stocks will be evident. The winter has been so far severe in the Baltic as to retard the early loading of cargoes, while variable weather in England has scarcely required the suspension of building works, or of internal traffic, to check the consumption of timber. The market prices of some descriptions are improved, of none are the quotations lower than last month, and our trade appears to be reviving.

Stock of Timber, Deals, &c., at the Public Docks on April 1.

	1870.	1869.	1868.
Foreign Deals, in Pieces	889,000	1,214,000	1,432,000
Battens „	438,000	776,000	680,000
Boards „	814,000	1,790,000	717,000
Fir Timber, in Loads ...	14,400	25,300	27,300
Colonial Pine Deals and Battens, in Pieces	856,000	452,000	611,000
Spruce do. „	626,000	1,051,000	290,000
Pine Timber, in Loads...	2,700	4,000	3,900
East Indian Teak „ ...	8,600	9,600	16,700

Foreign Deals, Battens, and Boards.—We have realised a good many Swedish redwood deals lately, establishing the improvement of 5s. to 10s. per standard; of battens the stocks are small; of boards also there is a sensible reduction in the quantities, though the energetic Norwegians give us little rest, loading cargoes in mid winter for the first chance of open water; and already we have fresh Norway battens and flooring boards on the market. Russian deals are in limited compass, and, therefore, at this time more attention is given to sales for delivery at the outports; so is it with regard to shipments from the ports of Finland and the Gulf of Bothnia. White deals of the lower class have rallied, and the market stock is nearly cleared out—in good time to be prepared for the fresh importation.

Baltic Fir Timber.—The stock is small, so is the demand; occasionally we sell a parcel within the stated quotations; but a little will satisfy the trade while waiting for the fresh snpplies now expected in May.

Lathwood.—Prices are again lower. It is always difficult to sell the past year's supply when fresh wood is looked for.

Firewood.—4850 fathoms arrived last month, overstocking the market. Christiana wood, 70s.; common boards, 60s. to 62s. 6d. Prices receding.

British America.—The delivery of 220,000 pieces of pine deals in March is favourable, although the present stock is nearly double that of April, 1869. Full prices are sustained, from the increasing dearness of pine in Canada, consequent on the superior demand of the United States. The delivery of 100,000 pieces of spruce deals still leaves us with 626,000 in stock—not large for past times, but exceeding our requirements, while this branch of trade is so much in abeyance. Though the prices in America are greatly reduced, few orders can be obtained for shipment, so we may yet find the present stock no more than wanted during the next four months.

Quebec Timber.—Very slow progress in selling pine timber, though we have small stocks to work upon. Elm timber has mostly gone into consumption; ash timber the same. Birch—small sized Canadian has been selling as low

as 50s., good sizes at 70s. to 80s. per load; the stock is overmuch and difficult to realise. Walnut—larger stocks than wanted, and prices reduced.

Oak.—Quebec oak is nominally higher by 10s., but no extent of business has been transacted for two months past. Dantzic oak, and Memel also, may be looked for next month in the early ships.

Riga Wainscot is less depressed; a quantity of wainscot boards has been selling, and several re-sales of Riga logs indicate the progress towards consumption; but the stocks are still too large to admit of operations for next season's supply. American wainscot in logs of good form and selection having been sold as low as 2s. 6d. a foot, and American wainscoat boards being difficult to realise at a small advance thereon, the shipment of any more should be discouraged. The fresh imports of Sclavonian logs are apparently of superior character.

Staves.—The deliveries of casks for the East India beer contracts being nearly completed, the trade is falling back into its previous inanimate state, and consumers evince no disposition to take off the small remaining stocks. Any attempt to press sales at the present moment only produces offers below the cost of importation. The sales made of Baltic staves have been altogether insignificant, and the same may be said of Quebec, the stocks having passed out of importers' hands. For United States staves the demand is limited to exportation, prices being too high for general home trade.

Pitch Pine.—Fine Georgian sawn planks have been sold at £12 standard; the other imports will not command as much. Square timber remains at the previous prices, with very little inquiry for it.

Masts and Spars.—For large masts we hear of nothing doing, whether of Oregon, New Zealand, or Canadian; efforts to sell secondary red pine spars for less than red pine timber have failed. Fresh Norway spars of the small sizes for ladders and scaffolds were realised at 1½d. per foot, but the market is by no means firm.

East Indian Teak.—The delivery of 1600 loads of teak in the past month results from the export for foreign governments and shipments coastwise; for the local demand has taken but a small part; as the arrival of fresh cargoes cannot be expected for some months, similar deliveries would in a short time materially reduce our stock, and have its natural influence on prices.

African Oak.—Sales made as low as £6 to £6 10s. per load have induced buyers to operate, after a long interval, in almost forgetfulness of this once reputed splendid hardwood. Greenheart is likewise moving at £6 per load.

Freight.—The Baltic rates are unchanged. Dantzic and Memel, 18s. 6d. per load; Gefle, Sundswall, and the Gulf Ports, 42s. 6d. to 47s. 6d. Petersburg standard hundred. For Quebec an advance on 75s. is aimed at. From the mills on the St. Lawrence, 70s. is the relative quotation; Cronstadt at 37s. 6d. Wyburg at 40s. to 42s. 6d. are the present quotations. Archangel remains at 75s.; Onega at 65s.

Mahogany.—All descriptions command a ready sale upon arrival at advancing prices. Of Honduras—the present stock is held entirely by the dealers; the last sale at public auction showed an improvement of about 12½ per cent. Of Mexican—only one cargo (507 logs) remains unsold; and of Tabasco—the importers have been free from stock for some time past; prospects are therefore favourable for fresh and early arrivals. Soft quality, straight grained logs, Honduras and Mexican, are still required (in substitution of cedar) for cigar box purposes. Of St. Domingo and Cuba—fresh imports are much wanted, the stock of the former being exhausted, and only a few old parcels of the latter remaining unsold. Logs of medium to large sizes and finely-figured veneer wood are in special request; a parcel of well-grown, sound, lengthy City St. Domingo curls would command an extreme price. The arrivals during the past month have been 359 logs Honduras, 520 logs Mexican, 50 Cuba (*via* Bremen), 44 logs at Nassau, and 111 curls at Boston; the sales reported have been 608 logs Honduras, 328 logs Tabasco and Mexican, 1106 logs Cuba, and 7 logs Surinam; the landed stock on 31st ultimo was 2499 logs Honduras, 1495 logs Mexican, &c., 5004 logs and curls Cuba, 803 logs and curls St. Domingo, and 818 logs West India, &c.

Cedar.—Lower prices have been taken for a parcel of 72 logs Honduras, lately sold at public auction, preference being now given by the cigar box manufacturers to soft-grained mahogany, which has been ruling from 25 to 30 per cent. lower in price than cedar; the stock unsold of the latter is, however, limited to a few logs just arrived from Mexico. The imports have been 106 logs, and the sales 102 logs Honduras and Mexican. Of Cuba there is no stock. Pencil cedar is seldom inquired for, and the stock of 1537 logs is sufficient for all probable requirements for some time to come.

Rosewood.—An import of 213 planks from Bahia, and 20 tons at Honduras, is the only new feature in the market. The sales reported have been 58 planks Rio upon private terms. The market is quiet, but there are inquiries for large, sound, dark-coloured planks, for which full prices could be obtained; there is also a demand for small-sized ordinary quality wood at a low price for turnery purposes. The landed stock consists of 1086 pieces Rio, and 706 pieces Bahia.

Tulip Wood is neglected; the stock is sufficient.

Zebra Wood is in better demand, and higher prices are now asked for the remaining stock, which is all held by the dealers.

Satin Wood.—There is a good demand for St. Domingo, Porto Rico, &c., the stock of which is all sold; large, sound, figured Bahama is also saleable, but inferior quality and small wood (which is accumulating in stock) is seldom asked for; the arrivals have been 2644 pieces at Nassau and 25 logs at New York. For East India there is no present sale, and the market is amply stocked.

Walnut Wood.—The chief demand is for the lowest priced small-sized Italian, the better class planks being comparatively neglected; the deliveries, however, continue upon a very satisfactory scale; the imports have been 1081 planks and 40 Burrs, the sales reported 2550 planks, and the landed stock is 15,531 planks. American black continues dull of sale, with a full stock on hand; the sales reported have been 36 logs.

Bird's-Eye Maple.—The market has been supplied with 123 logs at New York; the only demand is for fresh, white, well-figured wood.

Ebony.—For large, sound logs there is a ready sale at full quotations; for inferior qualities low prices only are obtainable. The arrivals have been 326 logs at Colombo, and 705 billets at Cape Lopez; there have been no sales reported.

Cocus Wood.—A fresh import of 23 tons Jamaica is the only parcel unsold; large sound wood is in special request.

Lignum Vitæ.—The existing stock of about 1440 tons is chiefly old and inferior, and very unsaleable; the demand is limited to the best round, sound City St. Domingo, from 5in. and upwards in diameter.

Boxwood.—The only description which is scarce and wanted is the best sound Abasia, from 2½ to 3¼in. in diameter; of other sizes the stock is sufficient with a quiet market. The imports have been 39 tons and the sales 67 tons.

Lancewood Spars.—The stock unsold is limited to the late imports, viz., 1203 pieces *via* New York, and 499 pieces at Jamaica. Moderate shipments of *fresh* spars would realise an advance upon present quotations.

Sabicu.—A few logs are occasionally sold at retail prices; but the remaining stock of 450 loads may be had under import cost and charges.

Referring to prices current annexed.

PRICE CURRENT OF WOOD.

	s. d.		s. d.
BALTIC FIR TIMBER, per load, 50 cubic feet			
Riga	57 0	to	62 0
Dantzic and Memel, crown	75 0	„	85 0
best middling	63 0	„	70 0
good middling and second	55 0	„	60 0
common middling	45 0	„	52 0
undersized	45 0	„	57 0
small, short, and irregular	40 0	„	50 0
Stettin	40 0	„	50 0
Swedish	47 0	„	53 0
small	40 0	„	45 0
Swedish and Norway Balks	30 0	„	38 0
BALTIC OAK TIMBER, Memel, crown	105 0	„	125 0
brack	80 0	„	90 0
Dantzic and Stettin, crown	85 0	„	125 0
brack and unsquared	50 0	„	65 0
WAINSCOT, per log, 18 cubic feet			
Riga, crown	85 0	„	105 0
brack	50 0	„	60 0
Memel and Dantzic, crown	70 0	„	75 0
brack	40 0	„	47 0

DEALS AND BATTENS, per Petersburg standard hundred	£ s.		£ s.
Archangel	11 0	„	12 10
Seconds	8 0	„	9 0
Petersburg	11 0	„	12 0
Wyburg	9 0	„	9 10
Finland and Handsawn Swedish	6 10	„	8 0
Petersburg and Riga White Deals	8 0	„	9 0
Memel and Dantzic crown red deals	12 0	„	13 0
brack	7 0	„	9 0
Christiania Deals, best sorts, Yellow and White	10 0	„	12 10
Norway Deals, other sorts	6 10	„	8 0
Ditto Battens, all sorts	5 10	„	7 10
Swedish and Gothenburg, good Stocks	9 0	„	10 0
Common and Thirds	8 0	„	9 0
Gefle and Best Swedish Deals	9 0	„	10 10
Swedish Battens	7 10	„	9 5
Dantzic, crown deck, per 40-feet 3-inch	0 18	„	1 3
brack	0 12	„	0 16

FLOORING BOARDS, per square of 1-inch	s. d.		s. d.
First Yellow	7 6	„	10 6
White	7 0	„	9 6
Second Qualities	6 0	„	7 0
Matched Boards (per sq. ⅜ and ¾-in.)	5 0	„	7 6
LATHWOOD, per cubic fathom			
Petersburg	6 0	„	6 5
Riga, Dantzic, Memel, and Swedish	4 0	„	6 0
FIREWOOD, per cubic fathom			
Swedish, Red Deal Ends	75 0	„	85 0
Norway Red and White Boards	60 0	„	75 0
Round and Slabs	45 0	„	55 0

OAK STAVES, per mille pipe	£ s.		£. s.
Memel, crown	140 0	„	150 0
brack	105 0	„	115 0
Dantzic, Stettin, and Hambro', full-sized crown	100 0	„	120 0
Canadian standard pipe	67 10		
Puncheon, per 1200 pieces	18 0	„	19 0
Bosnia single barrel, per 1200 pieces	27 10	„	28 0
United States, Pipe	30 0	„	40 0
Hogshead, heavy and extra	23 0	„	30 0
slight	17 0	„	20 0
INDIAN TEAK, per load	12 0	„	12 10
AFRICAN OAK	6 0	„	7 0
BRITISH GUIANA GREENHEART	6 0	„	7 0
CUBA SABICU	6 0	„	8 0
AUSTRALIAN IRONBARK	6 0	„	6 10

AMERICAN TIMBER, per load	s. d.		s. d
Red Pine, Quebec (for Yards and Spars)	75 0	„	95 0
(Mixed and Building)	50 0	„	65 0
Yellow Pine, Quebec, large	80 0	„	100 0
St. John's, and Board Pine	80 0	„	95 0
Building-sizes	60 0	„	70 0
Pitch Pine	60 0	„	70 0
OAK, Quebec	115 0	„	125 0
United States (nominal)	80 0	„	100 0
ELM, Rock	85 0	„	105 0
ASH	70 0	„	75 0
MASTS, Red Pine	70 0	„	120 0
Yellow Pine, large	85 0	„	120 0
Oregon	140 0	„	160 0
New Zealand	100 0	„	130 0
BIRCH, Quebec, large	75 0	„	95 0
New Brunswick and P.E. Isle	65 0	„	75 0
Small averages	50 0	„	60 0

AMERICAN DEALS, per Petersburg standard hundred	£ s.		£ s.
Quebec Pine, First Quality, floated	16 0	„	17 0
Second	12 0	„	12 10
Third	8 10	„	9 0
Ditto First Quality, Bright	18 0	„	19 0
Second	12 15	„	13 0
Third	9 10	„	9 15
New Brunswick, mixed Pine	7 0	„	8 0
Canadian Spruce, per Petersburg standard hundred	£8 10	to	£10 0
First	8 0	„	8 5
Second	7 5	„	7 15
Third	8 5	„	8 10
New Brunswick First	7 15	„	8 5
Second	7 0	„	7 10
Third	7 10	„	8 5
Unsorted	7 0	„	7 10
Nova Scotia and Prince Edward's Isle	7 0	„	7 10
BATTENS, Spruce	12 0	„	12 10
UNITED STATES, Pitch Pine Planks			

MAHOGANY, per foot superficial	d.		d.
Honduras cargo average	4½	„	5½
Mexican „	4½	„	5
Tabasco „	4½	„	5½
Cuba „	7	„	10
St. Domingo „	7	„	10
„ Curls „	12	„	24
CEDAR, Cuba (nominal)	6½	„	7½
Australian „	4½	„	5½
Pencil	2	„	4½
MAPLE, Bird's Eye	4½	„	5½
WALNUT, Italian	4½	„	6
Canadian	2½	„	3½
SATIN WOOD, St. Domingo	12	„	14
Bahama, per ton	£5	„	£9
East India	£6	„	£7

ROSEWOOD, per ton	£ s.		£ s.
Rio	15 0	„	25 0
Bahia	13 0	„	20 0
TULIP WOOD	12 0	„	18 0
ZEBRA WOOD (nominal)	8 0	„	10 0
EBONY, Ceylon	6 0	„	10 0
LIGNUM VITÆ, City St. Domingo	5 0	„	10 0
Haytian (nominal)	2 0	„	2 10
Bahama	5 0	„	8 0
COCUS WOOD, Cuba	5 10	„	6 15
BOXWOOD, Turkey	5 0	„	15 0
LANCEWOOD SPARS, fresh	0 10	„	0 12
ordinary to fair	4s. 6d.	„	7s. 6d.

LATEST PRICES OF MATERIALS USED IN CONSTRUCTION.

Timber.

	£ s.	£ s.
Teak load	12 0	12 10
Quebec, red pine	3 15	4 15
„ yellow pine	4 0	5 0
St. John, N.B. yellow	0 0	0 0
Quebec oak	5 15	6 5
„ birch	3 15	4 15
„ elm	4 5	5 5
Dantzic oak	4 5	6 5
„ fir	2 5	4 0
Memel fir	2 5	3 10
Riga	2 15	3 5
Swedish	2 0	2 13
Masts, Queb. red pine	3 10	6 0
„ yellow pine	4 5	6 0
Lathwood, Dant. fm.	4 0	6 0
„ St P'burg.	6 0	6 10
Deals, pr C., 12ft by 3 by 9 in.		
Quebec, white spruce	12 10	17 10
St. John, white spruce	12 10	15 0
Yellow pine, per reduced C.		
Canada, 1st quality	18 0	19 0
2nd do	12 0	13 0
Archangel, yellow	11 0	12 10
St. Petersburg, yel.	11 0	12 0

	£ s.	£ s.
Finland	6 10	8 0
Memel	7 0	9 0
Gothenburg, yellow	8 0	8 10
„ white	0 0	0 0
Gefle, yellow	9 0	10 10
Soderham	8 0	9 10
Christiania, per C., 12 ft. by 3 by 9 in yellow	10 0	12 10
Flooring Boards, per sq. of 1in., first yel.	7 6	10 0
First white	7 0	9 6
Second qualities	6 0	7 0
PUMICE STONE pr tn	6 0	8 0
OILS, &c.		
Seal, pale per tun	43 0	0 0
Sperm body	92 10	0 0
Cod	40 10	41 0
Whale, Sth Sea, pale	39 0	40 0
Olive, Gallipoli	57 0	0 0
Cocoanut, Cochin, tun	45 10	46 0
Palm, fine	40 10	0 0
Linseed	32 10	0 0
Rapeseed, Eng. pale	44 10	45 0
Cottonseed	31 0	35 15

Metals.

Lead:—

		£ s. d.	£ s. d.
Pig, Foreign	per ton	18 2 6	0 0 0
„ English, W.B.	do.	19 5 0	0 0 0
„ Lead Co.	do.	19 0 0	19 5 0
„ Other brands	do.	18 10 0	18 17 6
Sheet Milled	do.	19 5 0	19 10 0
Shot, Patent	do.	22 0 0	0 0 0
Red or minium	do.	20 0 0	0 0 0
Litharge, WB	do.	0 0 0	0 0 0
White dry	do.	26 0 0	28 0 0
„ ground in oil	do.	26 0 0	29 0 0

Copper:—

British—cake and ingot	per ton	70	0	0	71	0 0
Best Selected	do.	71	10	0	73	0 0
Sheet	do.	75	0	0	76	0 0
Bottoms	do.	78	0	0	0	0 0
Australian	do.	71	0	0	74	0 0
Spanish Cake	cash	0	0	0	0	0 0
Chili Bars „		67	0	0	68	0 0
„ refined ingot		69	10	0	72	10 0
Yel. Metal Sheathing & Rods	per lb.	0	0	6½	0	0 6½

MEETINGS FOR THE ENSUING WEEK.

Monday.—Institution of Surveyors. Parochial Assessments, by Mr. E. Ryde. 8.

Tuesday.—Institution of Civil Engineers. Discussion "On the Maintenance and Renewal of Railway Rolling Stock." 8.

„ Society of Antiquaries Anniversary. 2 p.m.

„ Royal Institution. On the Principles of Moral and Political Philosophy, by Prof. Blackie. 3.

Wednesday.—Society of Arts. A Narrative of the Works of the Suez Canal, by D. A. Lange, Esq. 8.

„ Geological Society. 8.

Thursday.—Royal Institution. Lecture by Prof. Tyndall, LL.D., F.R.S. 3.

Friday.—Architectural Association.

„ Royal Institution. 9.

Saturday.—Associated Arts Institute. The Physiological Aspects of Colour, by W. Cave Thomas, Esq. 8.15.

„ Royal Institution. On Astronomy, by Prof. R. Grant, LL.D., F.R.S. 3.

Trade News.

TENDERS.

Holborn.—For water-closets and sculleries at the Holborn Workhouse. Mr. H. Saxon Snell, architect:—

Patman and Co.	£95 0
Sabey and Son	82 0
Bridgman and Nuthall	76 0
Starkey (accepted)	66 10

Kentish Town.—For the erection of minister's house attached to Wesleyan chapel, Leighton-road, Kentish Town. Mr. J. Willey, architect:—

T. Niblett and Son (accepted)	£885

London.—For re-building Nos. 48 and 49, Bishopsgate-street, for Messrs. Barker and Sons. Tolley and Dale, architects. Quantities by Mr. Birdseye:—

Sewell	£8576
Ashby and Co.	8450
Ennor	8374
Johnston	7745
Rivett	7691
Howard	7560
Little	7437
Patman and Co.	7385
Browne and Robinson	7270
Newman and Mann	7156
Conder	6980
Nightingale	6947
Manley and Rogers (accepted)	6437

Norfolk.—For enlarging and restoring Starston Church, exclusive of the old materials. Mr. R. M. Phipson, F.S.A., architect:—

Grimwood (accepted)	£725

Red Hill.—For building two residences at Frenches, Red Hill, for F. Campion, Esq. Mr. Lees, architect:—

Cook	£3141
Baguley	3036

Snaresbrook.—For the erection of an infirmary and new east wing to the Merchant Seamen's Orphan Asylum. Mr. G. Somers Clarke, architect:—

Myers	£13,970
Browne and Robinson	13,520
Mansfield, Price, and Co.	13,361
Nightingale	13,234
Kirk and Parry	12,970
Markwick and Thurgood	12,880
Conder	12,769
John Kirk	12,749
Bayes and Ramage	12,672
Manley and Rogers	12,557
Brass	12,295
Chappell	12,170
Pattinson	11,990
Kilby	11,987
Perry and Co.	11,980
Hill, Keddell, and Waldram (accepted)	11,764

COMPETITIONS.

Bradford Abattoir Company Limited.—Extension of time to 2nd May.—Plans, &c., of a slaughter-house, cattle sheds, and all necessary appurtenances to a slaughter-house proposed to be built at Bolton Bridge; also plans for an hotel and outbuildings, adjoining to Bolton-road, and near to the proposed slaughter-house. The directors will give £20 for the best, and £10 for the second best set of plans. Messrs. Dixon and Hindle, Land Agents, &c., Kirkgate, Bradford.

Manchester, May 30.—For abattoirs and a carcase market. The following premiums will be awarded:—One of £150, one of £100, and one of £75. Joseph Heron, Town Clerk, Town Hall, Manchester.

CONTRACTS OPEN FOR BUILDING ESTIMATES.

Cambridge, May 6.—For the erection of a corn exchange, in Wheeler-street and Corn Exchange-street. Edmond Foster, town clerk, Cambridge.

Evesham, May 2.—For the restoration of S. Mary's Church, Chelmswickham. Rev. J. Hartley, Chelmswickham, near Broadway.

Halifax, April 30.—For the erection of a Unitarian chapel. Mr. William Bakewell, architect, 12, East-parade, Leeds.

Doncaster, April 27.—For the erection of a corn exchange, also carpenter's, joiner's, plasterer's, glazier's, and other works connected. Mr W. Watkins, architect, Lincoln.

Doncaster, April 27.—For the ironwork required for the roof of the new corn exchange and the roof of the vegetable market and works in connection therewith. Mr. W. Watkins, architect, Lincoln.

Metropolitan Board of Works, May 3.—For the supply of materials, cartage, supply of men, horses, and carts, and slopping and cleansing of roads. Metropolis Roads Office, 32, Craven-street, Strand.

Bournemouth, May 2.—For execution of town sewer works. C. C. Creeke, Esq., surveyor, at the office, Bournemouth.

St. Giles's, Camberwell, April 25.—For repairing Ann-street and Carlton-road, also kerbing and paving the same. G. W. Marsden, Vestry Clerk, Vestry Hall, Camberwell.

Gravesend, May 4.—For designs and tenders for supplying and fixing an ornamental iron fence from 3 to 4ft. high in Windmill-street. Mr. J. Gould, surveyor, Parrock-street, Gravesend.

Brighton, May 5.—For rebuilding the Countess of Huntingdon's Church, North-street. Mr. J. Wimble, architect, 2, Walbrook, E.C.

Midland Railway, May 2.—For the corrugated iron roof required for a carriage shed at Derby Station. Engineer's office, Midland Railway, Derby.

Kent County Lunatic Asylum, April 28.—For additions to the chapel. Mr. M. Bulmer, architect, Tonbridge-road, Maidstone.

Litchurch Local Board, May 3.—For the construction of filter beds for the interception of the sewage. Mr. Whiston, Clerk to the Board, Litchurch.

Tunbridge Wells Local Board, April 29.—For the construction of brick and earthenware pipe sewers, forming roads, &c.. on the Woodbury-park estate. T. Lewis, Clerk to the Board, Town Hall, Tunbridge Wells.

Shipley, April 27.—For wrought-iron roof for new retort house, wrought-iron hydraulic main, and all the cast and wrought-iron work for a stack of 84 retorts; 2 iron scrubbers, with 14in. connections; a station meter, eq. 30,000 cubic feet per hour; a station governor, eq. 100,000 cubic feet per hour; a quantity of socket pipes, turned and bored, consisting of about 600 yards of 18in., 1800 yards of 12in., 1400 yards of 2in. Tenders to be addressed to the Chairman of the Shipley Gas Company, Shipley, near Leeds.

Shipley Gas Light Company, April 27.—For the erection of a new retort house, engine house, meter house, and the alteration of other buildings at their works. Mr. W. Wright, the secretary, Gas Works.

Prestwich, May 3.—For paving and flagging, &c., of part of Myrtle Bank-road, Rainsough. Michael Potter, Clerk to the Board, 88, Moseley-street, Manchester.

Pontefract, May 4.—For the erection of a depot for the First West York Regiment of Militia in Pontefract. Mr. Bernard Hartley, West Riding Surveyor, Pontefract.

Ramsgate, May 6.—For extensive repairs to the Apron of the East Sluices of Ramsgate Harbour. C. Cecil Trevor, Assistant Secretary, Harbour Department, Board of Trade.

Salford, April 29.—For the execution of the works required in the proposed enlargement and certain alterations of the Workhouse in Eccles-road.

Salford, April 29.—For the oak fittings in the room in the Town Hall, Salford. George Brett, Town Clerk, Town Hall, Salford.

Haworth, April, 28.—For the erection of a Primitive Methodist Chapel, at Mill Hey, near Haworth. Sugden and Smith, architects.

Ilkley, April 28.—For the erection of shop premises in Brook-street.

Whitwood, April 27.—For the erection of the Briggs memorial clock tower and spire, to be attached to the parish church. Mr. Ingham's office, Whitwood, near Normanton.

London, April 26.—For repairing the carriage and footways of Smithfield. Joseph Daw, Principal Clerk, Sewers Office, Guildhall.

War Department Contracts, May 6.—For the reconstruction of 1 atrines at Forts Wallington and Nelson, Portsdown-hill. Colonel W. C. Hadden, Royal Engineer Office, Portsmouth.

War Department Contracts, May 6.—For the construction of sewage tanks, and completion of drainage at Ports Purbrook, Widley, Southwick, and Nelson. Colonel W. C. Hadden, Royal Engineer Office, Portsmouth.

War Department Contracts, May 12.—For laying a gas main from Royal Artillery Barracks to Royal Marine Barracks, and erecting a meter house at Woolwich. Colonel W. D. Gossett, Royal Engineer Office, Woolwich.

BATH STONE OF BEST QUALITY.

Randell, Saunders, and Company, Limited, Quarrymen and Stone Merchants, Bath. List of Prices at the Quarries and Depôts; also Cost for Transit to any part of the United Kingdom, furnished on application to

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[Advt.] Corsham, Wilts.

BANKRUPTS.

ACT 1869.—TO SURRENDER IN LONDON.

Broadbent, Thomas, Highgate, plumber, April 26, at 2—Kerriage, William, George-street, Notting-dale, builder, April 28, at 12.

TO SURRENDER IN THE COUNTRY.

Brockland, John, Carlisle, timber merchant, May 2, at 2—Elliott, William Cornish, Plymouth, builder, May 4, at 11—Kirkland, John, Liverpool, engineer, May 2, at 2—Webster, George, Stockton-on-Tees, builder, May 4, at 12—Goulding, J., Blyth, Northumberland, builder, April 27, Newcastle—Hutchings, J., Binstead, Isle of Wight, builder, April 30, Newport—Lever, B., Wycombe-marsh, Chepping Wycombe, builder, May 5, Aylesbury—Parker, Henry, Warton, Lancashire, carpenter, April 28, Preston—Pike, J., Teignmouth, builder, April 27, Exeter—Shaw, Thomas, Ilkeston, joiner, May 6, Derby.

ACT 1869.—PUBLIC EXAMINATIONS.

Fern, S., Wincobank, near Ecclesfield, joiner, May 5—Wilson, G., Ramsgate, builder, May 27.

DECLARATION OF DIVIDENDS.

Anthony, W., Aberdare, contractor, div. 4s. 6d.—Jones, T., Newport, timber merchant, div. 3d.

DIVIDEND MEETINGS.

J. and W. Roose, Ashbourne, plumbers and glaziers, May 17.

SITTINGS FOR LAST EXAMINATION.

Dawson, J., Fulham New Town, builder, June 17—Pipes, E., Burton-upon-Trent, plasterer, May 11

SCOTCH SEQUESTRATIONS.

Hewitt, J., Dumfries, painter, April 22, at 12—M'Onie, W., Greenock, engineer, April 25, at 1.

PARTNERSHIPS DISSOLVED.

Sismey and Moore, White Horse-street, Stepney, and Fern-street, Bow-common, builders—Wood, Ward, and Co., Leeds, joiners—Collier and Elliott, Brentford, dealers in slate—Dover and Co., Leamington Priors, builders—Murphy and Diggle, Bury, slaters—Drake and Co., New Kent-road, concrete builders—Firth and Sons, Halifax and Brighouse, plumbers and gas fitters—Bates and Walker, Walbrook, iron merchants.

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The Nails are manufactured by J. J. Cordes and Co. out of Scrap and the best kinds of Pig Iron, and have long since earned the reputation of being superior to all others. The Nails are all uniform in make and quality, each one perfect and count out full 1,000 to the M.

DOS WORKS, NEWPORT, MON.

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&c., &c., &c.	W. R. Callender, jun., Esq., M.P.

W. Swindlehurst, Manager and Secretary.

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P. J. HARVEY, Secretary

Momentous, Mystical, and Musical Easter Entertainments.—Sand and the Suez Canal (a momentous question), by Professor Pepper; with curious Sand Experiments and Dioramic Illustrations.—Novel Musical Entertainment, by George Buckland, Esq. (Mystical and Spectral), entitled, THE HEART OF STONE: a Legend of the Black Forest, with astonishing Spectral Scenes and New Music.—Dugwar's marvellously agile "Tomahawk Throwing," and centre of gravity performances—The American Organ daily.—Lecture, by Mr. King, "On a curious Chinese Torpedo."—Napoli's Mechanical Pictures, and all the other entertainments daily, for One Shilling, at ROYAL POLYTECHNIC.

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They require no restraint of diet or confinement during their use and are certain to prevent the disease attacking any vital part.

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To Builders.—Dulwich Estate. The Governors are prepared to LET on LEASE, for 84 years, PORTIONS of their ESTATE, for building purposes. There is ample railway communication, and special educational advantages in the new College are secured to occupiers of houses on the estate. For plans and particulars apply to Charles Barry, Esq., 1, Westminster-chambers, Victoria-street, S.W., architect and surveyor to the Governors.

THE BUILDING NEWS.

LONDON, FRIDAY, APRIL 29, 1870.

THE ROYAL ACADEMY.

ARCHITECTURE is the only one of the three arts which has no annual flowering season, no particular time in which it may bloom out to the connoisseurs and lovers of art in full beauty and complete adornment. Every year on the 1st of May, the painters and sculptors reveal to the world through the exhibition of the Royal Academy at once in all their perfection the flowers and fruits of their year's labours, while the architect can but produce the vague and hollow semblance of his work, for an architectural perspective in no way brings before the public what the building itself will be, when as an actual block, and aided by its size, surroundings and accessories, it stands before them as a finished work. It is much as if the painter were forced to exhibit the charcoal sketch for his picture, instead of the picture itself, or the sculptor the rough clay model, instead of the chiselled marble. Then we must consider, also, that the architect works from the very first before the eye of the world: it may watch his labour, criticising its details and disputing its taste, if so disposed, from the foundation stone to the last slate of the roof; and this very fact of watching produces a certain weariness, the mind takes no cognisance of the completed structure, the impression remains vague and uncertain. How different to that which a sculptor or painter may succeed in making by a work begun and carried out in the silence and solitude of his own studio, and which, like Minerva springing fully armed from the head of Jupiter, enchants the taste and mind of the art-loving world when first seen in all its completeness on the opening day of an exhibition.

Having begun with pointing out, as an architectural paper should do, the unequal footing on which these three arts are placed, not for the sake of cavilling at that which is clearly unavoidable, but for the sake of fairness and justice, we can with a clear conscience proceed to our criticism of the Royal Academy in this its second year of its new home. The casual observer takes but little notice of the hanging of the pictures, but he is probably insensibly either gratified or irritated by their arrangement. Much art and taste is required in placing pictures so that they should not have an injurious effect one upon the other, and so as to preserve a symmetrical disposition, which shall immediately strike the eye as harmonious and regular. The hangers this year have been fairly successful in their work, and have placed nearly all the pictures with a due regard to the light in which they have been painted. We already hear the usual amount of complaint from the outsiders concerning the rejected works, but as impartial judges, we must acknowledge that, to our mind, many pictures have obtained places which fall considerably below the standard of merit that the Academy from its position is bound to maintain. Another room has this year been added to the exhibition, namely, the lecture room, in which Millais' fine portrait of the Marchioness of Huntly is hung, but notwithstanding this arrangement, we believe the number of pictures actually placed is less than last year.

A very great change has taken place in the English school since the reaction from Pre-Raphaelitism set in. The danger in a reaction is always the length to which it goes, and this year it seems to us to have been carried too far, even by one of the greatest of our painters, Millais, once so devoted a member of the brotherhood of Pre-Raphaelites; and if one of the chiefs of the school goes so far, who has genius, knowledge, and experience to cover his looseness of painting and chique, is it to be wondered at that the lesser painters, striving after the same thing, fall into worse errors, and, not having such gifts to raise them up, remain in the ditch crushed by their own dashing efforts after effect. Surely, brilliancy in painting is not attained by heaping on the colour as if quantity were the thing in art; and it is at least more gratifying to our feelings that too much pains should be taken with a picture than too little, even though we are assured that this little pains is just that which stamps the work as a [really artistic performance. Mr. Calderon's pictures this year are an instance of this incompleteness and poverty of painting. His "Spring pelting Winter with Flowers" is the most advanced example of the tendency of all his works in this year's exhibition; we expect better things from him. Last year his boat picture was one of the gems of the Academy. The left hand centre of the great room is taken up by Sir E. Landseer's picture of the Queen and Prince Consort landing from a boat on one of the Highland lakes; it was painted many years ago, and exhibited as unfinished, and has since been much worked upon and completed. On the opposite side is a fine work by Maclise—alas! the last from his hand—and near to it, No. 202, Millais' large picture of "The Knight Errant." This is a work of greater importance than he has painted for some time, and the subject one which the great painters and poets of all ages have loved to treat, Innocence rescued by Valour. Mr. Millais has done justice to this old but ever new subject, and has enriched it with a fine work of art. The painting of the flesh is fresh and beautiful, the armour a brilliant and most dashing bit of execution, and the background at once suggestive and romantic, but much as we admire this picture, we turn with still greater pleasure to his "Young Raleigh," No. 334. The action of the boy as he listens with rapt attention to the sailor's tale is remarkably good, and the entire colouring of the picture very fine: by the way, the sailor is dressed more in the costume of a Greek or Italian mariner than in the homely Devonshire habit. This painter's picture of "A Flood" is in the second room. The unconsciousness of the child amid the desolation of the waters is charmingly given; it is smilingly gazing at the little pearl-like rain drops on the boughs which overhang its cradle, while poor little puss, whose experiences have not been quite so peaceful, is mewing away in great discomfort; the clayey colour, though true to nature, is perhaps a trifle exaggerated. We must not omit to mention the fine portrait of John Kelk, No. 48, which confirms to Millais a high rank as a painter of male portraits. No. 176, Mr. Poole's only picture, is rich and glowing in colour, dreamy in effect, and full of poetry, very unlike the dry rendering of the same subject by Sandro Botticelli in a picture belonging to Mr. Barker, now in the Kensington Museum. M. Alma Tadema's two pictures, Nos. 148 and 152, exhibit his usual power and skill, and will enhance his reputation with the English public. Mr. Faed has a very clever work called "The Day is Done," No. 192. A labourer, tired with his day's work, is resting in a chair, while the old grandmother is putting the bairns to bed. No. 199, "The Lord Chancellor," by H. T. Wells, is a picture of mark, and commands more attention than an ordinary portrait, from Lord Hatherley's being painted surrounded by the ceremonials of his office. The painter has succeeded in bringing out the chief figure extremely well in an artistic sense, but we are inclined to think that the attendants will engross too much of the public attention; all the accessories are most conscientiously given, but the execution, taken as a whole, is perhaps a little too thin. Mr. Cope's picture of a punt, in the great room, is rather too pale in colour; we prefer his other work, taken from the "Merchant of Venice," where the youth Gobbo is justifying Shylock's description of him by snoring after a heavy meal. This picture has much quiet humour about it. This painter's portrait of a child is also a very characteristic work. Mr. Redgrave has but one picture in the great room, painted from one of his early etchings of "Jack o' Lantern." The little sprite, half Puck, half friar, is leading an unfortunate rustic through endless swamp and quagmire. No. 157, "Sir Roger de Coverley and the Widow," is Mr. Frith's best work. It is good in colour, and more carefully executed than usual. The confidante seems to be the only person alive to the awkwardness of the situation, and the lover is more passive than bashful. Mr. Hook has two very excellent pictures; he has this year broken new ground by taking Holland as the field of his labours. From his peculiar facility for painting water in its full perfection of ripple he is unrivalled as a painter of sea scenery; but here, in his "Market Women of the Scheldt," No. 158, he has shown us his power of painting the same element in the silvery sheen of an unruffled surface, while the buxom women, with vegetables, fruit, and eggs, give colour and richness to his foreground. Mr. Watts has three pictures this season; in the principal one, "Fata Morgana," No. 193, in the great room, from the Italian of Boiardo, an armed soldier is attempting to retain the spirit, but as, like Time, she is only to be held by the forelock, she is passing away and eluding his grasp, The difference between the flesh painting of this nymph and that of Millais' Virgin is worth careful study. No. 203, by E. M. Ward, is painted with his usual coarseness of colouring. No. 161, Mr. Elmore's large picture, is very fine in colour, but the subject is a painfully sad one. The President has a good portrait of Mrs. Meynell Ingram, in the great room. Two of our best portrait painters, Boxall and Richmond, are not represented in this year's Academy; and Mr. Leighton sends only one small picture. No. 178 is a picture of rather a pretty page boy coming out of the well-known ball-room door at Haddon; it is by W. Fyfe—a name new to us. Mr. Hart's large picture is too strong in colour, and all the faces unfortunately Jewish-looking. Mr. G. D. Leslie has a portrait, in the great room, No. 210—a young lady in a greenhouse, with flowers—painted with his usual grace; but his large picture, No. 104, "Telling Fortunes," occupies the end of Gallery II. The subject is a group of young girls throwing roses into a stream—as a subject commonplace enough, but the way in which it is treated transforms it into a perfect idyll of youth, sunshine, and dreamy delight; the colour is charming, and the method of treating the background very original. It is a work of much refinement and beauty, and will greatly add to this painter's reputation. Over this picture is placed Landseer's portrait of Voltigeur, the celebrated racehorse belonging to Lord Zetland. Sir Edwin has also a very clever picture called "The Sick Monkey," No. 265; the colour is excellent; the monkey-physician treats the invalid with more than professional indifference, and calmly sucks away, with his rich brown nozzle, at the orange which is his fee, while the monkey-nurse bends rather more tenderly over the patient. In Nos. 183 and 337, two sea pieces, Mr. Herbert has struck out in a somewhat new line; but we confess to more satisfaction in his figure-pictures than in his present subjects. In the 5th room is a clever picture, by Keeley Halsewelle, of priests bargaining for an altar-piece in the market-place at Rome; a begging friar going forth with his ass to seek donations, the flitting of a peasant family, and other incidents, fill up the picture, which, though a work of great merit, is founded, too apparently, on the style and method of the late John Phillip.

As it appears to be a rule of the Academy that each of the members should have a work in the great room, to which gallery our attention has been chiefly devoted, we have not been able to remark upon many very original pictures by artists who are not yet members of this body, but we hope amply to make up for this defect in a future notice.

PROSPECTS OF THE ARCHITECTURAL EXHIBITION.

We are glad to learn that the prospects of this Exhibition are promising, and that it will be quite up to the mark of past years—in fact, some interesting departments of it have never before been so good. That of sketches from ancient buildings, for instance, is remarkably full, and contains admirable specimens by Mr. Edmund Sharpe, in conjunction with Mr. Brewer, Messrs. Edward l'Anson, W. Burges, W. Emerson, R. P. Spiers, Ernest George, H. Marshall, R. J. Talbert, T. Vaughan, while Mr. J. D. Crace has added several of Moorish and eastern decorative work. These have proved sufficient, with photographs of executed works, above and below the line of sight, to fill the smaller gallery, which last year was occupied by the sketches of the late Rev. Mr. Petit.

Among drawings of works of modern architecture, some of Mr. Street's successful designs for the proposed new Law Courts will be seen, with a picturesque view of a quadrangular block of stabling which Mr. Burges is building for the Marquis of Bute at Cardiff; Mr. Emerson's Bombay Cathedral; details of an interesting new church, by Mr. W. White; some villas, by Mr. Edis; a quaint church interior, by Mr. Truefitt; a striking building for the storage of wine for the Duke of Wellington in Spain, by Messrs. George and Vaughan; Mr. E. W. Godwin's Dromore Castle; churches by Mr. Ewan Christian, Mr. Joseph Clarke, Mr. Buckeridge, and Mr. Kempson; Mr. Seddon's Fulham Almshouses; mansions by Mr. S. S. Teulon, Mr. W. M. Teulon, and Mr. Thomas H. Wyatt. Among decorations are some beautiful art tiles and sketches for stained glass, by Mr. Cook; designs for sculptures and paintings for S. Peter's Church, Vauxhall, by Mr. Pearson, which are well worthy of study; decorations for Dromore Castle, by Mr. E. W. Godwin.

We are unable to state how far the collection of architectural drawings may be comparable to that at the Royal Academy, but we think that it is of sufficient merit and interest to be looked upon as an affirmative answer to the question put by the committee to the profession, as to whether it is needed as a supplement to that before mentioned. It does not consist, as many suppose, of drawings inferior to or mere duplicates of those sent to the Academy, but is mainly composed of works of a more practical nature than what are alone considered suitable for that more popular exhibition. The Architectural Exhibition is and must remain specially for the profession itself, and to architects it is very interesting, and is looked forward to by those in the provinces as well as in the metropolis; and the former are regular frequenters of the galleries in Conduit-street, and careful students of their contents. In them and in them alone can the various designs sent in to the several competitions of the year be seen and compared, and we do not hesitate to say that it would be a great loss if this opportunity were to cease. Here the merits of the respective designs are submitted, as it were, to a second and more dispassionate tribunal, and one more competent than most of those that actually decide those questions which are of no slight moment to the competitors and to the public as well, so that morality as well as architecture would suffer by the suppression of the exhibition. We speak thus strongly, because it behoves the profession to consider well whether or not it will support it. It has been continued quite tentatively on this occasion, that the committee might ascertain whether, in the first place, the exhibition is needed, now that the Royal Academy has greater space at its disposal; and secondly, whether, if needed, the profession will subscribe for its support, for without subscriptions it cannot exist. It must be accepted as a fact, though a painful one, that the public care too little about architecture to enable the promoters to trust to receipts at the doors. We call then upon those provincial architects who may visit it during the year to weigh well its claims, and to enrol their names in t he list of its subscribers. We do not say that the exhibition is all that it ought to be, or that it may fairly be expected to become. It needs support in kind as well as in money. It needs that architects should send their working drawings of the buildings they execute, which they can well do without the expense incurred in prepared drawings for the Royal Academy. There are several examples of such drawings on the walls of the galleries in Conduit-street, which will explain what we mean, and we commend the consideration of them to the whole of the profession.

THEORY OF THE ARTS.

The conditions under which primitive art took root have been stated; and we shall find the earliest conceptions in architecture, as in the other arts, were but the offspring of that predominant conception of mankind—the theological—which was the basis of all effort, the fount of all early inspiration. This dominant and pre-existent idea being the substratum of all primeval art, its homogeneity, unity, and its early progress were natural consequences. Reposing upon a theological or a poetic basis, the fine arts at once found all they needed for a provisional and complete existence, obtaining also a ready and spontaneous co-operation from this one powerful system, then the source of everything. As far as architecture was concerned, there were no conflicting considerations to weigh, no difficulties of purpose or construction, as at present; and in the material temple was found its highest realisation, its completest fulfilment. The varied elements of nature, difficulties, needs, and the events of life, however contrary, found distinct embodiment in deities who are invoked for special purposes; such were Juno, Lucina, Neptune, Mars, Ceres, Mercury, &c., and these required fitting shrines. Such was the ultimate destination of all art conception. Even the constructive element was subordinated to this governing principle; for there were none of those complex arrangements of different forces which we now have to resort to, for producing the maximum of strength with the least amount of material at command. Eastern imagination soon converted building into something like poetry; as mysticism begat symbolism in religion. There was little intellect to reason out the constructive science of architecture which was thus the inseparable handmaid of religion. There was an alliance between the two till art ceased to be dependent upon a dominant church or creed. Till this time arrived, architecture had not a separate existence as an art in the sense it has now; it had not become a distinct power or law of itself, wanting as it did an independent basis on which to work.

Hence, in the styles of Egypt, Assyria, and India, there is much that is grand, imposing, and original; but comparatively little of that skill or science which economises material, creates large results from small means, or by which complicated arrangements are solved. The old artists had one simple conception, which they wrought out regardless of cost, material, and labour. The grandeur of their structures arose from ponderous masses, to which was superadded in time a fine sense of proportion, almost instinctive at first, though afterwards improved by geometrical knowledge, which was an advanced science even at this period of the world's history. The simple lintel or trabeated construction comprised the whole secret of their architecture, on which a process of refinement, gradually leading to an abstract principle of design, attained perfection, as in Greek architecture. The more uncivilised states of society, possessing no intellectual strength or refined conceptions, required representation to assist. "The Persians and Egyptians," says Lecky, "failed remarkably to keep pace with general civilisation in their æsthetic development." There was a fixity in their architecture and art as soon as the first stage was reached, which was all the unaided mind and imagination could do. In Egypt, indeed, the profession of the artist was made compulsory and hereditary, and a symbolic significance was all art aspired to. Indian religion ever soared to the terrible, the unnatural, hence its art was more grotesque and fanciful than beautiful.

To begin with Egyptian art, as being the earliest. We find the Pyramids typified best the conception of the Egyptians. Material and mass accorded with their childish superstition and their sensual and material worship of the Deity. They were not progressive; in fact, the oldest pyramids show as refined a degree of art as the later monuments of that strange and reserved people. Even their sculpture and hieroglyphics were just as perfect and quaint at the early period of the pyramids as they were later. Being skilled geometricians, the Egyptians soon attained a knowledge of forms best suited to express and perpetuate their ideas. They built only for eternity, sacrificing every other quality to this object. A massive grandeur and solidity, rather than refined taste or beauty, was the predominant conception. Though stationary, however, their art was a perfect art of the age, simply because it could not advance a step further without a fundamental alteration in the mode of thought and religious sentiment of the people. Their painting was subordinated to form and architecture in a more complete manner than we find among other nations. Form, not colour, was their chief and first study. Their painting indeed, was but coloured sculpture. Among the Egyptians, sculpture was practised by the priesthood, but there is wanting that *ideal* beauty in it which characterised the works of the Greek artists. With the Egyptians the figures were mere transcripts of nature.

From our present standpoint, Egyptian art has a material solidity and a childishness of character, rather than that intellectual and abstract refinement which indicates later periods of civilisation. During a period of not less than 4000 years, the same improgressive and stable character appears in its monuments; and the exclusiveness of Egyptian civilisation leads to the conclusion that its art was essentially an indigenous one; and, perhaps, in its mode of expression, as much characteristic of the early fetichism or mythology which a materialistic religion created, as that of any other nation. Mr. Fergusson says if there was anything like progress in this art it is certainly more observable in the works of the eighteenth and nineteenth dynasties. It was to the eighteenth dynasty that that marvel of material grandeur the Hypostyle Hall at Karnac, belonged, while the Rhamession, by Rhamses the Great, developed the Egyptian conception to the highest point attainable. Comparing the Hypostyle Hall at Karnac with the Parthenon, or with a much later example, Cologne Cathedral, Mr. Fergusson shows the far greater advantage possessed by the latter examples in respect of the far larger proportion of open area to points of support. But in all earlier monuments and temples the aim of the builders was to make the material building *itself* the main object more than its use; and I think this law is very noticeable and holds good throughout the history and development of architecture—namely, that the material aspect of the art has invariably preceded the higher technic and æsthetic qualities of it. Mr. Fergusson says that one half of the merit of the great Hall at Karnac is technic, while æsthetically its merits are very small. Though the Egyptians understood the principle of the arch it was very timidly used, and was left for a later people to constructively develop.

G. H. G.

(To be continued.)

SHOP FRONTS.

(*Concluded from page* 294.)

THE precise point, in fact, wherein the shopkeeping mind needs education is, that good architecture forms a feature of attractiveness in itself. A shop front composed of nothing but plate glass is like a picture without a frame. The picture may in itself be a good one, but will frequently be passed over in favour of another not near so good, if the other be only placed in a richly-decorated frame. In like manner, the articles displayed by a tradesman, without the accessories of appropriate building decorations, lose half their power of attracting customers. We are conscious of descending from high artistic ground in taking this view, but it is nevertheless a near and true view of the subject, and, until the shopkeeper has obtained some independent art education, it is the only one likely to have much influence with him. The passion for enormous sheets of plate glass has perhaps done more to prevent the creation of good designs than anything else. It is a most expensive taste; the price of the largest sheets are truly enormous, and the danger of fracture entails a heavy charge for their insurance or replacement. Added to this, it is perfectly impossible for the architect to do anything in the way of decorating them. The utmost he can attempt is the introduction of sash bars in brass, mahogany, or some coloured material; and these he is called upon to keep as thin as possible, in order that the valuable sheets may display their full dimensions. He must add nothing that shall diminish their size, or hide as much as a few inches of their surface. These instructions, while embarrassing to the designer, seem to us entirely unnecessary and useless in a multitude of businesses. In most shop windows that we have observed the goods shown are arranged with some idea of classification more or less accurately defined. Thus, the shoemaker has his ladies' and gentlemen's department; the retail stationer his paper, book, print, and *bijouterie* department; the linendraper has a host of separate departments; and so on through the greater number of trades. In the more extensive businesses, the duty of arranging the goods for display—or "dressing the window," as it is called—in each department is entrusted to a separate individual, believed to possess special knowledge or taste in that particular line. It would be a great assistance to such an individual if the space allotted to him were marked by well-defined lines, and ornamented with fit architectural designs; and there can be no doubt that such a plan would prove quite as potent in attracting customers as the heterogeneous display often jumbled together behind one or two enormous sheets of plate glass. Such a division would be most appropriately marked by the perpendicular lines of columns or piers required to support the arch or bressummer above; and if its principle were universally admitted, the trade purposes of the shop would be perhaps more perfectly fulfilled than now, and a field would be opened at the same time for the taste of the designer.

The next question that arises is, What should be the general principle regulating the taste of such designs? Not many years ago, in the dandy days when the "first gentleman in Europe" gave the tone to all things social and artistic, it was an accepted maxim that street architecture should aim at a principle of uniformity, so as to produce a superficial and deceptive appearance of extensive grandeur. It was under the influence of this principle that Regent-street and the various other London improvements of the time were designed. A study of better models, and a more truthful and healthy tone of public sentiment, has, however, brought this maxim into discredit. As the lines of street frontage are, in fact, split up into various proprietorships, are occupied for a great variety of purposes, and as the owners must naturally have a great variety of tastes, it is only fitting and proper that all these facts should be expressed in the architecture. Hence it may be inferred that no one style can be said to be universally preferable to another. Variety in gracefulness and adaptation forms the true principle of beauty in this case. Each house elevation and each shop front may differ from its neighbour, and, provided it be neither tasteless in itself, and the contrasts not inharmonious, the general result will be far more striking and satisfactory than an effort at Classic grandeur, or an affected greatness which every beholder knows does not extend an inch below the painted "compo" in which it is executed.

There are, however, several cautions to be observed in the application of the various styles to shop fronts. In the period just referred to, architecture and design were nothing if not Greek or Roman. Shop fronts of course partook of the prevailing taste, but it was not perceived that the style adopted should not be that of the Classic *temples*, but of the smaller and more domestic structures. We gladly welcome the grace and delicacy of Grecian detail, but solemnity and grandeur, which were chief characteristics of the ancient temples, are utterly unsuited for the light and airy character appropriate to modern shop fronts. If, therefore, a Classic style be adopted, the designer must beware of mere copyism. We do not want a reduced model of a portion of any ancient building, originally designed for another climate and another purpose, but an example of the modifications and adaptations of which the style is capable. Beauty, accuracy, and finish should be the aim rather than breadth, and the Classical forms should not be degraded to mere nick-nacks. Any person who has entered into the spirit of the style will consider Doric pillars, although surmounted with metopes, triglyphs, and guttæ of the most orthodox proportions, strangely misplaced, if the intercolumniations are to be filled with plate glass enclosing bizarre productions undreamt of in Classic Greece, or if they only adorn a shop board where salmon and mackerel, or sprats and lobsters, are laid out in state.

Many hints for successful studies can be gained by a careful observation of the French and Italian Renaissance styles, as well as from the English Renaissance known as the Elizabethan. There are several good examples of these extant in the streets of London familiar to most people, such as that designed by Mr. Herring for Messrs. Swan and Edgar, in Regent-street; that of Fortnum and Mason, in Piccadilly (in which, however, the windows are somewhat smaller than would be permitted nowadays), and at the corner of Berners-street, Oxford-street. It would seem that the Renaissance styles are more promising of tasteful variety than any others, because of their extreme plasticity. They are founded—the foreign styles more particularly—not upon the style of the ancient sacred edifices, but upon that of their smaller works—their triumphal arches, baths, houses, and other buildings of a domestic and civil character. Hence their characteristic is not magnificence, but elegance. The various Classic orders are used avowedly as details of decoration, and there is no limit to the multiplicity of both sculptured and chromatic ornament which may be introduced. These are matters of great importance in designs which must come so close to the eye as shop fronts. We have already referred, incidentally, to the use of the Pointed styles. Here, as in the other styles, the aim should be beauty, not grandeur; and recourse for models to be studied—not copied—should be had to domestic and civil rather than to ecclesiastical art.

The question has often been raised whether there is a probability of any really new style of architecture ever being invented. If it be, we think it is as likely to be developed from a faithful study of the present subject as from any other. The variety of possible treatment being great, it offers the most likely field for putting new architectural ideas to the test of experiment. The scale of construction is usually but a small one, and the materials used not always being of so durable a nature as stone and bricks, opportunities are afforded of alterations and rectifications impossible in other departments. We are not justifying the sudden execution of immature and heedless notions. The experiments should be well considered, and carefully executed; and if such experiments were tried on the small scale for which shop fronts offer so favourable a field, their effect would soon show whether they were likely to succeed if tried upon a larger and more enduring scale.

Besides the general question of the fitness of styles, there is that of special adaptation both of convenience and design to special businesses. On the point of convenience the opinion of members of each trade will deserve great weight; on that of design some remarks are necessary. The idea of illustrating the trade by the design of the building, though containing some truth, has been carried to absurd lengths. Thus we have existing, in Gerrard-street, Soho, a shop front designed originally for a seal engraver's, though now occupied by a carpenter and undertaker; and this consists entirely of a magnified quatrefoil panel—a piece of detail appropriate enough as an ornament in tracery, but preposterous when applied to an entire window. We think this perhaps the ugliest shop front to be seen in London. Again, we have a Regent-street shop front, where Indian shawls form the staple of trade, in which the pillars take the form of palm trees, with their crown of foliage; and another, devoted to the sale of umbrellas and parasols, in which the lines are all of the curved shape characteristic of umbrellas, and of the architecture of Eastern India, the native home of the umbrella. These forms, being beautiful in themselves, are tolerable; but the further application of the principle needs great care and taste on the part of the designer. The trade is best indicated by the actual goods exhibited, and any architectural reference to it will be more appropriately found among the details of embellishment than in the misuse or mere enlargement of structural forms.

Some shops, as those of fishmongers, butchers, and poulterers, require an open space entirely free from plate glass. In such cases the aim should be to produce a pleasing interior, and much scope is afforded to produce good effects. The use of ornamented tiles for wall decorations opens a field for chromatic decoration in such cases, of which the designer should not be slow to avail himself. In shops for the sale of provisions a good effect, both of spaciousness and cleanliness, is given by the employment of white glazed tiles, either with or without ornamental patterns being worked in with them.

It would be so manifestly impossible to lay down a series of complete rules for the design of shops for particular trades, that we have chiefly attempted, in the foregoing remarks, to enunciate general principles which may be taken up and worked out by any one who applies himself to his vocation with a spirit above that of the mere trader or mechanic. At the same time, a few hints of a very brief kind as to some peculiarities in the more usual classes of shops may fittingly close the subject for the present.

A *Butcher's shop* requires to be open, as a rule. If windows are used they should be movable; they are only wanted in the coldest weather; at other times plentiful ventilation must be provided for, both when the shop is open and closed. This affords an opportunity for designing some good ornamental ironwork above the line of shutters. The general aim must be to produce a good interior.

A *Poulterer's shop.*—A somewhat rusticated style of woodwork would seem very appropriate for this shop, and the wood would have a more pleasing effect if it retained its natural colour and were simply varnished.

Jeweller's shop.—This requires a design of

great elegance and richness, yet very plain. If the ornamentation of the front be too luxurious, it will tend to depreciate the rich effect which should be produced by the goods within. Jewellery is best set off by the use of dark polished wood, slightly set off by gilding. A similar remark applies to any window used for the display of fine art productions of the smaller kind.

Upholsterer and Furniture Dealer.—This trade requires length rather than height, and a considerable depth of view within. The aim should be to show a pleasing interior enclosed with glass, differing in style from the interior shown in those not so enclosed, in the same manner as the styles of internal and external decoration naturally differ.

The business of a *Seedsman and Florist* is mostly carried on in the suburbs, and the shop has no building above it. This gives a good opportunity to make use of a very light style. Single sheets of plate glass appear, however, inappropriate, inasmuch as they do not afford sufficiently ample means of ventilation. The aim should be to give a considerable depth of interior view. The upper part might be a conservatory.

These remarks form only a specimen of what might be said respecting the special requirements of a number of trades, but to add to them would be useless, as any individual design must be subjected to requirements which cannot be foreseen. All that we can do is to draw attention to this too-neglected field, and to point out that though the works are necessarily constructed upon a small scale, they are well worthy of being carefully studied and designed, and that, if they were so, we should not only add much to the attractiveness of our streets, but might create a taste for true and genuine works, which would materially promote the art education of the people, and help on, although in a humble way, the progress of art itself. W. H. R.

ARCHITECTURAL ASSOCIATION.

At the usual fortnightly meeting, held on Friday evening last, the President (Mr. Lacy W. Ridge) in the chair, the following members were elected: E. H. Burton, C. H. McKinn (of New York), A. W. Lambert, and S. Salter, jun.

It was intimated that to-morrow (Saturday) the members would visit the palace of the Bishop of London, at Fulham, and some new almshouses in the neighbourhood. The members are to assemble in Fulham Churchyard, at 3 o'clock.

The Chairman said it was now publicly announced that the Architectural Art Classes, for which the Association had been so long agitating, were to be opened at the Architectural Museum on the 3rd of May. On that day the Figure Class, and a class for the study of ornament, would be opened. As the season is now so far advanced, it was proposed to have only a half-session, extending over the months of May and June. There would be about 25 meetings of the Figure Class in this time, and the subscription will be 15s. The Ornament Class will meet in two divisions. Class B 1 is to meet at half-past nine in the morning. This division is intended for those who are able to get away from their employment, and is, to a certain extent, experimental. The evening division will meet on Tuesday and Thursday evenings, from half-past seven to nine o'clock. The fee for either division of this class will be 10s. for the half-session. This class is under Mr. Wallis, the curator of the Architectural Museum, and the Figure Class will be presided over by Mr. Weekes. It is hoped shortly to announce the formation of a Water-colour Class. After alluding to the money that had been contributed or promised by the senior members of the profession towards the establishment of these classes, the Chairman appealed to his audience, the juniors, for whose benefit the classes have been instituted, to contribute their quota to the necessary preliminary outlay.

Mr. F. T. Dollman, A.R.I.B.A., was to have read a paper on "The Progress and Development of Church Architecture in England since 1830," but failing at the last moment through illness, his place was supplied by Mr. H. C. Boyes, who read a paper on

Modern Mediævalism.

After stating that the paper was not written for a professional audience, Mr. Boyes proceeded to sketch the history of the Gothic revival, and to discuss how far it has been the natural result of a real change in the condition of society, or how far the mere unnatural artificial reproduction of antiquated forms (sometimes by ignorant romantic imitation, sometimes by accurate antiquarian restoration, but always equally unsuited to the age in which we live) which the enemies of Gothic art would have us believe it to be. Mr. Boyes's paper was based on the theory that the arts (and especially the architecture) of any age are the natural outcome, and form for posterity the most accurate evidence, of the state of society and the spirit of the times in which they re created. After some remarks in support of the general accuracy of this theory, the author proceeded to show that for three centuries previous to the commencement of the modern Gothic revival, Mediævalism and barbarism were synonymous terms. The first symptom of a change in taste was Horace Walpole's so-called Gothic villa at Strawberry Hill, which was more of a toy or curiosity than a work of architecture. It might be classed under the head of ignorant romantic imitations, though quite equal, if not superior, to much of the work which similar motives has since given rise to; it possessed at least one good quality, picturesqueness. From the time of the erection at Strawberry Hill to the days of the elder Pugin all the Gothic architecture that was attempted was of the same class of ignorant romantic imitation. The writings of Sir Walter Scott had popularised Mediævalism, but the principles of Gothic art were very little understood. Next in architecture came Carter, Britton, Rickman, the elder Pugin, and others, who made the study of Mediæval art the business of their lives, and succeeded so thoroughly in mastering a complete knowledge of it that it may be doubted whether it is even now so well understood, either in its principles or details, as it was by them, though a perhaps less accurate knowledge is now much more widely diffused. This thorough knowledge brought on the day of that accurate antiquarian reproduction which still is nearly the most powerful force in modern Gothic. Welby Pugin, though a man of intensely original genius, cannot be regarded as the advocate of much more than this antiquarian view of Mediævalism. He continually protested against a mixture of foreign styles with our English Gothic, and objected to any expression of modern feeling in the revived art which he so strenuously advocated. His whole life was spent in an endeavour to galvanise Gothic into the same sort of spasmodic and unnatural life that Classic art had achieved under the Renaissance. Still, his name is the one most intimately associated with the Gothic revival, and it is difficult to overestimate the amount of life and force which his enthusiastic genius threw into the movement. Mr. Boyes said that although no doubt, as an exercise in the education of architects, the study of Gothic art and correct reproductions of it are very desirable, the copying and and the constant subserviency to precedent which antiquarian reproduction leads to are opposed as much to the Mediæval as to the modern spirit. Throughout the whole growth of Gothic architecture nothing is more remarkable than the almost disdainful neglect of all previous styles by the designers of every fresh building. It was not that the Mediæval architects did not understand the previous style, but that they were confident that they could improve upon it. Since Pugin's time the growth of modern Mediævalism has been wonderful. Not only has it become more general in architecture, but it has been incorporated with almost every art and manufacture. We have mediæval furniture and undertakery, Mediæval type, and *machine-made* Mediæval jewellery! In most of these things, however, only the earliest and ignorant romantic-imitation stage of the Gothic revival has been reached. Mr. Eastlake's book on furniture and decoration was a decided advance into a revival of the Mediæval spirit. Mr. Ruskin's writings were next noticed as having had more influence on public than on professional taste, such of his architectural theories as are at all practical having been learnt by architects from the study of ancient monuments. In conclusion, Mr. Boyes pointed out the high ideal standard of religion and morals in Mediæval times and remarked that the disciples of culture, "sweetness and light," and the believers in "muscular Christianity," had established an ideal standard for the modern gentleman as high as that of chivalry—an ideal in marked contrast to the spirit of the times when Mediævalism was despised; at the same time, we have seen a revival of Mediævalism in art and a progress in architecture so marked and so rapid as to surpass any art development that has ever before occurred, and which leads us to look forward in confident hope to the art of the future.

In the discussion which followed,

Mr. Aldridge said with regard to Mr. Boyes's strictures on antiquarian reproduction, that in architectural education it was necessary to start with precedents, and to study what has been done before. Having become acquainted with all that has been accomplished, one might reasonably hope to do something further. Attempts to create something fresh had arisen in many cases with men who knew very little about architecture.

Mr. T. H. Watson concurred with Mr. Aldridge.

The Chairman thought that Mr. Boyes had not done justice to Pugin in saying that he appeared to aim at nothing more than archæological reproduction. To a certain extent that was true, but Pugin went further—he opened out and strongly insisted on the *principles* of the old buildings, and it was this that gave the great start to the Gothic revival. Those principles have in them the seed which must ultimately do away with the archæological view of architecture. The aim of all who studied within the Gothic school should be to lead up by degrees to a style of architecture which shall be sensible, real, genuine, and in accordance with modern feeling. As an example of the application of Gothic to modern purposes, the Chairman referred to All Saints' Church, Margaret-street, which he said was a very great advance upon the simply archæological church. S. Peter's, Vauxhall; S. Alban's, Holborn; S. Columba, Shoreditch, were also referred to as being important examples of thoughtful endeavour to adapt Mediæval architecture to the requirements of the present day. There is as much difference between any one of these churches (said Mr. Ridge, in conclusion) and an "archæological" church as between Gothic work of the thirteenth and that of the fourteenth century. Two or three other gentlemen having made some remarks on the subject, the usual vote of thanks to the reader of the paper brought the meeting to a close.

S. JAMES'S CHURCH, GREAT YARMOUTH.

The chancel only of this church, the situation of which is at the southern extremity of the town, has as yet been built, was opened yesterday. It forms one of the arms of a building, the nave and transepts of which in conjunction with it will form a Greek cross, the crux being carried by four columns, which will be the only internal supports. The several arms of the cross communicate by wide arches with the nave and chancel aisles, whose roofs will be parallel to the central axis. A tower and spire are designed to project from the north-west angle. The church will accommodate between 1000 and 1200 persons, when complete. The walls are constructed of flint-work, with brick quoins and bands, with freestone copings, sills, window traceries, &c. The interior is lined with coloured brickwork, arranged ornamentally, the upper portion of the walls and spandrels of the arches being diapered with red crosses on a buff ground; the soffits of all the arches also are diapered in colour, and will have a pleasing effect. The east window, which is 30ft. high and 20ft. wide, and raised 20ft. above the floor of the chancel, at present has a temporary filling in of fine brickwork, with three lancet openings, but will ultimately have mullions and rich tracery inserted. The roof, which is strongly framed with principals, will hereafter have a curved ceiling with panels divided by moulded ribs with carved bosses at the intersections, and the central crux a domical ceiling similarly treated. Lofty pinnacles are intended to rise at all the external angles of the building, to form abutments to the vast arches. At present the arches built, of which the main one is 33ft. wide, have their thrust retained by wrought iron bars at the level of the capitals of the columns. The cost of the chancel, in the incomplete state above described, has been about £1000, and the contemplated cost of the whole structure is from £8000 to £10,000.

The Fine Arts.

THE INFLUENCE OF THE FINE ARTS ON CIVILISATION.*

BEARING in mind the doctrine I laid down in a former lecture as to the utility of art—I repeat, in the highest sense of that over-shouted and often misplaced term—it will be my object, at the commencement of this evening's discourse, to prove that the inutility, so freely ascribed to music, more than to the sister arts, is of all common heresies the most false; and further—whatever denunciations may be hurled at other arts, on the plea that they merely minister to acquired tastes—that music satisfies a mental want coeval with existence. Other arts have been created by the perceptive faculties of man; music was born with him.

The power of sound pervades creation, from the very elements down to the meanest obstacle in animal life. The breath of life and light, the sighing of the evening breeze and the roaring of the midnight storm, the hum of insects, the lowing of the herds, and the chirp of birds, sing eloquently of the present; whilst the never-dying murmur of the calmest wave, as it touches or leaves the smoothest pebbled beach, breathes audibly of eternity. But in man, through the working of his heaven-born ingenuity, sound attains the highest power of expressing the emotions natural to his present existence, and music, born with him, is the link that binds him to another world. In his dreams of an after-life, when he pictures to himself a state free from earthly impurities, the only mortal utterance he thinks worthy of existence is a celestial life in music. So, although its strains be polluted by mortal passion, to my mind music is the soul's lost language, the echo of which is so faint and fleeting, so vague and indescribable, that it needeth the temporary stoppage of life's mortal pulse to catch those whispers which instil a dream of a former and a purer existence. For there is music in very silence. In the evening twilight, with no stir of life around you, and not the faintest sound in the air, music is yet present; you may not hear it, but you do more—you *feel* it.

This, however, is not the time or place to indulge in airy speculations, but to treat of art as it affects our earthly welfare. Now, of all the arts music is the most spiritual in its nature, and if its voice be not wholly intelligible to human capacity the cause must be found elsewhere than in its poverty of expression. Moreover, if the antiquity of any art may be regarded as its highest claim to respect, we must award the superiority to music, or even to dancing, over all other arts; and though its intellectual progress was slow, yet in contributing to human happiness its influence preceded that of the most useful arts. Even as a public entertainment music, has a prior claim to poetry, and long before the drama existed people assembled to witness the feats of musicians and dancers. Nor can it be wondered at that, in an intellectual sense, the progress of music has been slow, and that it is only in comparatively late times that it has been enabled to rivet the attention for its own sake, and without the assistance of other arts. For music is a language which requires extraneous aid to make it intelligible, and the human voice, though the most perfect organ for expression, is too limited in scale and power to give full utterance to its varied effects. Science has supplied all that was wanting to that end, but long indeed was the interval between the Pandean pipe and the modern orchestra. There is, however, no unmixed good, and science of late years seems inclined to abuse its privilege in aiding the efforts of art. It has turned its attention from quality of tone to mere quantity, and monstre drums and trombones bellow out sounds which, deaf as he was, would have shocked Beethoven's ears.

But though science has lent more aid in developing the hidden power and resources of music than it has to the sister arts of poetry and painting, yet that music is a natural gift more than any other art is proved by the fact that whilst you may reckon great poets and painters by the score, though the number of musicians exceeds that of the professors of other arts in their respective times of prosperity, yet you cannot name more than six or seven who merit, in an equal degree, the title of greatness. Nor does this result, as some have asserted, from the fewer qualities to be developed in music than in its sister arts; for though poetry, painting, and music appeal through different organs of sense, yet, the entrance once passed, the road to the heart is common to all; and though the modes of expression are outwardly different, the means inwardly are not dissimilar. Form and colour are not exclusively the property of the painter any more than melody and harmony are that of the musician, or rhythm and eloquence that of the poet. All these qualities belong, with more or less prominence, to art in common. And though it is said, in disparagement of the intellectual power of music, that it cannot render the outward and visible shape of what it seeks to represent, yet that it can express the feeling excited by the real presence may be proved by many examples. Is there a poem or picture illustrative of nature more perfect in the expression of the emotions its varied expression excites than the "Pastoral Symphony" of Beethoven? or can the utmost efforts of the sister arts succeed in expressing the fitful moods of love so strongly as music has rendered in the sonata in C sharp minor of the same composer? It annoys me, even to indignation, that people who ought to know better should have dared to give a title to each movement of the symphony, as descriptive of some feature of nature, or to call the sonata "The Moonlight." Music does not describe the real presence of nature, but simply the emotions aroused by it, and the latter title is especially false. That sonata is simply a tale of unrequited love, and it is dedicated to the lady who alone, as far as we know, aroused that passion in the composer's heart. And how eloquently he describes its progressive emotions! Sweetly as a dream the passion possesses him. Then we get a brief expression of delight in the scherzo, succeeded by a more brief awakening in the trio. It is the custom now to repeat the scherzo, but in the earlier editions of the work there is no indication from the composer to justify the practice, and wisely so; for to that sudden awakening from the brief dream of hope succeeds a wild torrent of passion, subsiding in a strain of tenderness the beauty of which no other language of art can surpass. That tenderness is followed by the complaint which earnestness ever utters on finding no reward. Then, in a few bars, we hear the voice of resignation, to be set aside by another burst of passion. But, even as in nature, the fit is more brief, the subsequent tenderness is prolonged, and the tale is completed in resignation, as powerfully uttered as was the first burst of passion. I only regret, having given you the key, that I have not Charles Hallé by my side to open the heart of the mighty composer.

A few words on the "Pastoral Symphony," which I regard as the most perfect poem ever written to embody the varied emotions excited in the presence of nature. It would be well if critics would accept it in that light rather than treat it as descriptive of its real presence. Most eloquently it expresses our delight in the presence of sunshine and beauty—reaching, at times, to an ecstatic revelling in the pleasure of existence; to be followed at intervals by the most intense utterance of gratitude. Without disparaging Rossini, how poor in expression are the storm and succeeding calm in his overture to "William Tell" to that of Beethoven in the "Pastoral Symphony!" There may be no actual resemblance to thunder and lightning, wind and rain; but the ceaseless roll, followed by sharp, incisive notes, and their immediate downpour, impress us with the emotions natural to the scene far more than poetry or painting could arouse.

Take, again, Mendelssohn's Italian Symphony, to each movement of which critics have affixed a title which the composer never dreamt of. The whole work is simply the expression of the impression produced on a sensitive mind by the beauty and the fallen greatness of the country and the undying vivacity of its inhabitants. The first movement is exuberant of delight, the second—stupidly called "The Pilgrim's March"—is expressive of those emotions which are excited by the exhibition of fallen greatness. The scherzo questions the wisdom of sorrow, and leads to the national exposition of forgetfulness—in rollicking dance.

Even at the risk of wearying you with proofs of the folly of nicknaming the productions of music, I cannot pass over the C minor Symphony of Beethoven—the most sublime exposition of the power of music. It is said that the four notes with which the symphony commences were written in Beethoven's hat, during a walk, for want of paper. Worthily were they committed to memory, for they announce the birth of a life which, in spite of its vicissitudes, ends in triumph.

Who, indeed, but the most thoughtless, frivolous, and superficial of observers, can accuse the musician of being actuated by no more intellectual motive than that of producing sweet sounds, or deny the power of music in expressing abstract feelings? It is the language of delight and gratitude at the blessings of life, of sorrow for its vicissitudes; and in the expression of love and every mortal passion it can give an additional force after that of any other art has expended all its resources. Has painting or poetry ever expressed the intensity of exultation as powerfully as music has done when through Handel it announces that "Unto us a Child is born, a Son is given," and his name shall be "Wonderful—King of kings—Lord of lords?" Equally sublime and powerful in expression, though lowlier by nature of the theme, is the chorus of prisoners in Beethoven's *Fidelio*. Emerging from their gloomy dungeons to enjoy a moment's liberty, their utterance is subdued through prostration and fear; but gradually, as the free air and sunlight work their beneficent influence, their feelings cannot be restrained, and their united voices give utterance to a burst of delight and gratitude—too soon to subside, as hurriedly they are ordered back again to their gloomy cells.

Nay, more—music has the power to express human passions, not only in the abstract, but in all their variety. How different in feeling are Beethoven' "Adelaida" and the love-song of Polyphemus in Handel's *Acis and Galatea*, and yet how faithfully they develop the character of the respective lovers! The first needs no comment; but I cannot help pointing out a few distinctive features of the song of Polyphemus. It is rollicking and rugged, yet the savage is refined by the passion that consumes him:—

> He cannot prate in puling strain
> Of lady's love and beauty's chain.

He is but a monster, and expresses his adoration according to his unwieldly nature, and even when he rises to the height of adoration on the words, "Oh, nymph more bright than moonshine night," he proceeds by rugged intervals to the climax of his passion; the accompaniment throughout expressing the revelling desire rather than the sighing tenderness of the heart's longings.

(To be continued.)

* Read by Henry O'Neil, Esq., A.R.A., on the 21st inst., before the Society for the Encouragement of the Fine Arts.

CHIARO-SCURO IN ARCHITECTURE.

AT a recent meeting of the Liverpool Architectural Society, our old friend and contributor Mr. Samuel Huggins read a paper "On some important principles in architecture, illustrated in an ideal tour throughout the world." We give the concluding portion of the paper, which treats of chiaro-scuro, or light and shade in architecture:—

The chief cause or source of beauty and power in a building is, says Mr. Huggins, the light and shade, as it is in a picture of that building. It is a more essential element in architecture than it is in painting and sculpture, in which arts there is more to atone in some measure for its partial absence or deficiency than there is in architecture, which is absolutely dependent for legitimate effect upon the composition of forms and relievo. With a view to light and shade, all planning has been conducted in all great buildings. All buildings celebrated for their beauty present the eye with large masses of shade brought up against and heightening the value of the important and prominent parts illuminated, and give strength and power of effect to the whole.

Light and shade was a prime element in the Egyptian and Greek temples, more especially in the provision of the deep and solemn pronaos, or front portico. Indeed, neither Egyptian nor Greek ever erected a building in which it was not a prime element of effect. It is the chief charm in the beautiful courts of the Alhambra; it is the beauty of the Italian loggia, in all which the openings and depth of recesses express the primary idea of shelter, grateful to the mind in oriental lands from heat, and in occidental and

hyperborean climes from damp and cold. In interiors—the beauty of S. Stephen's, Walbrook, is its exhibition of plan or form within form. It is the same in S. Sophia's, at Constantinople, and in the Roman Pantheon, and in all great interiors. But breadth and depth of light and shade is embodied in all great buildings, ancient, modern or mediæval, oriental or occidental. We see it in Gothic minster, in Moorish palace, in Indian tomb, in all architecture aspiring to excellence, to excite the loftier emotions. In all such I believe it must ever be a prime element.

The same principles of uniformity and variety, or of variegated unity, which guide the historical painter in planning the figures and general forms of a picture, with a view to a broad distribution of light and shade, are to guide the architect in arranging the masses of his building, so that they shall form an effective and harmonious whole. There should be in an extensive architectural composition, as in painting, groups and masses of light, half light, darks and half darks, and reflexes; and of these lights and darks one should be principal, the rest subordinate, and all generally co-operating to produce a totality and completeness in the work; and, as in painting the principal light is generally so disposed as to give the greatest lustre to that part where the action and personages are of the greatest consequence, so in architecture the highest light will be generally in the central entrance, portico or porch, and fall on entablature, column, archivolt—that is on the brightest, richest, most delicate and graceful forms, while the deepest shade will be brought up to enhance their value, and throw out these richest and brightest forms in the design.

In grand architecture the darks must be extensive, and must greatly preponderate over the lights and middle tints; and the grandest can only be had where a round arched style gives the opportunity for openings of any breadth and height consistent with grandeur of concomitant parts and arrangement; that is to say, it is more in the power of an arcuated than of a trabeated style to arrange for large and deep masses of shade, producing the greatest breadth and brilliancy of effect; and the Byzantine and Romanesque styles seem better than the Gothic. It is only in such, I believe, you can have the utmost measure of what is properly called breadth of effect, which may be defined as abundance of one thing in one place, or, as Ruskin says, "mass of everything—of bulk, of light, of darkness, of colour, not mere sum of any of these, but breadth of them; not broken light or scattered darkness, nor divided weight, but solid stone, broad sunshine, starless shade."

If you are under the necessity of having a square or oblong block, with a number of small equal openings—if you are not allowed to group or deepen some of the latter, recess others, and bring out a third—you may produce a pleasing building, but you cannot produce a powerful building, or such as will excite high emotions in the breast, because it will lack some of the essentials of architectural greatness.

What Reynolds says of finish in painting will apply to detail and sculptural decoration in architecture—"The highest finishing is labour in vain unless there be at the same time preserved a breadth of light and shadow." You may have beauty of colour to atone in some measure for want of form, and I believe in flat blocks of building, which cannot, from their nature, position, and purpose, as great street rows, have much variety or relief from shadow, it should be sought in opposition of colour in the materials, as in pictures painted on a light key. But that is a lower element of architecture, as it is in painting.

Where the artist is at liberty to relieve by light and shadow, variety of colour is of little consequence. But where he is necessarily restricted, here coloured brick is of great value. It should, I think, be employed to assist shadow, or repair the shortcomings of chiaro-scuro.

Colour in architecture, say what you will about it, as it arose in the east, so it belongs to the east and south, to brighter climes than ours, and can never be a prime element in northern architecture. But be this as it may, let me say distinctly that I consider the charm of beautiful *form* as greater than any arising from colour or rich material, and that it is, and must ever be, the chief merit of architecture.

While the greatest buildings chiefly owe their beauty to it, some could be pointed to which owe their failure to a want of it: S. Peter's, at Rome, and the new Houses of Parliament, at Westminster, may both be cited with advantage as a warning on this head—as failing of legitimate effect, the former from the non-employment of detached columns, and the latter from the division into too minute openings of windows and doors.

The superiority of S. Paul's Cathedral to S. Peter's at Rome consists chiefly in the superior provision for light and shade in the colonnades of the western front and transepts and dome tower, which are wanting in the Roman edifice. The latter is equal to S. Paul's in beauty of outline, and superior to it in size and sculptural embellishment and magnificence, and in simplicity of design, being of one order, while S. Paul's is of two. But its designers ignored the chief source of poetic beauty and power in architecture—namely, provision for play of light and shade by the projection and reception of parts. It has not one detached column; all its columns are attached. It is without porticos, which give it a blockish effect, which is aggravated by the colonnades of the area or front courts.

This building has been the subject of strange remarks. It has been praised for what are its faults; it has been blamed for what are its beauties: as, for example, the attic order, which is one of its greatest merits, however treated or proportioned. But none, I think, have ever pointed out what is its great defect. St. Peter's Church at Rome not only cannot be void of merit, it cannot be without great qualities, coming, as it does, from under the mighty hand of Michael Angelo, who, of all concerned in it, had perhaps most to do with it; but it has the great defect of being without any adequate provision externally for light and shade—a defect which Wren, who must have been greatly indebted to that building, carefully avoided, for the chief merit of S. Paul's is plentiful display of light and shade in its west front.

The greatest merit of S. Paul's is the arrangement of the portico of the west front for bringing up the deepest shade to heighten the brilliant light of the columns and the half light of the flanking west towers, of which Wren has made the best possible use in his design. Yet, strange to say, this chief merit of S. Paul's is seldom mentioned, and in buildings that owe most to it is not acknowledged. S. Isaac's Church, at S. Petersburg, a gigantic plagiarism from S. Paul's, ignores this feature, or, at least, makes no attempt to emulate it, and fails utterly in achieving the poetic power and unity of S. Paul's. I suppose so important and costly a commission, under imperial patronage, for the metropolitan church of a great empire, was never executed with so little of architectural genius as this spoiled reproduction of S. Paul's Cathedral at S. Petersburg, which is good at least for showing that breadth of light and shade cannot be got by merely sticking on Greek porticos to a square block of building.

The one thing opposed to this quality in the northern Gothic—the style chosen for the Houses of Parliament—is the non-employment of the detached column on a full scale on the exterior, which I look upon as the great defect of the style, excluding from it much of the sensuous beauty that charms us in the Classic. The column, wherever it occurs in the Gothic in its integrity, with cap and base, and detached, and even where, as in door and window reveals, it is not entirely detached, is among the redeeming beauties of the style. The miniature arcade galleries in the thickness of the walls, originated by the Lombards, and which were not superseded by the Gothic, as Mr. Fergusson asserts they were, but continued into the Pointed style, and appear in the Cathedral of Paris, and in many others, forms the most beautiful ornament of that or of any style. In the towers of Laon Cathedral, in France, where the detached column is liberally introduced, and occurs here clustered, there single, it gives a magical and romantic effect of lightness, and a poetic play of light and shade that is truly charming. Beasts are seen looking out from between these columns as from between the bars of a cage. But it nowhere occurs on the great scale as in the interiors or in some cloisters, where its exceeding beauty shows what it might have done for the west fronts of cathedrals had it been there applied, and embodied in a porch or portico—a feature which seems to have been more nearly approached in the Romanesque and Byzantine styles than in the Gothic. The Cathedral of Pisa is an attempt at the complete Greek Periptery, which was too much. It is only in the fronts it would be admissible in the style, and there it would be an immense improvement; and nothing would mark a nobler step in advance by the modern Gothic school than the development of a detached columnar portico, or porch of clustered or grouped columns, for the fronts of their churches.

Chiaro-scuro in architecture, as in painting, must always remain, from its nature, difficult to teach or bring under the government of rules. The student should watch the finest examples under their best effects of light and shadow, and try to get at the seat of their charm; a good deal of sketching, and even of modelling, should be directed to this end.

Nothing would have a happier result upon our architecture than the successful study and application of the principles of light and shade by architects, and the uniform aim on their part at breadth and depth of effect in public if not in private buildings; nothing, I say, would have a happier result upon our architecture than this. It would at once become noble and real; for only in proportion as a building has depth and reality can it have this breadth of light and shade.

This principle applies to interiors as well as to exteriors: for this we had best go to some of the great buildings of the middle ages on the Continent—the French Gothic cathedrals—which I consider among the master-pieces of the world in the kind or character of architectural beauty proper to Gothic, or, in fact, in any kind. There is a chaste classic simplicity in the plans of these edifices—Paris, Amiens, Evereux, Chartres, Beauvais, which, by the way, show more sympathy with the Greek temple plan (often exhibiting the cylindrical shaft of quite classic proportions) than the English, which are quite the antithesis of it.

In the whole of this great group of edifices the architects seem vieing with each other for the production of the greatest and most beautiful interior, of which they seem to have had the truest conception, a higher and truer than the English: for in some of these, at Rheims, Amiens, Beauvais, which latter I suppose to be one of the most glorious apartments on earth, some of the highest notes of architecture have been struck. In all these the principle of depth, or of plane behind plane, has been exhibited to perfection, and the amplest provision made for breadth and power of light and shade by the arrangement of the side aisles and disposition of the light, which in these are carried to the utmost perfection of conceivable beauty by the circular or multangular apse, which it is truly wonderful the English architects should have omitted: a feature so necessary to combine the side perspectives and give the highest interior unity and grandeur, of which the French architects had so true a conception, and which the Arabians also sought in their great mosques by circular and domed terminations. If the French architects sacrificed exterior to interior grandeur, they made the sacrifice on the *right side*, the enclosure of interior space in the grandest manner being the highest object of our art. But the expression of internal length is what was chiefly aimed at by the English architects, and the fine effect of the colossal stained window at the altar terminating the vista, which was also favourable to external grandeur; though, with some contrivance, the same degree of the latter quality could, I believe, have been had along with the French internal arrangement.

(To be continued.)

PARLIAMENTARY NOTES.

Metropolitan District Railway Bill.—Mr. Crawford gave notice on Monday that on the motion for the third reading of this Bill he should move that it be read a third time that day six months.

Settled Estates.—Mr. Stapleton obtained leave on Tuesday to bring in a Bill to enable the owners of settled estates in England and Ireland to charge such estates, within certain limits, with the expense of building mansions as residences for themselves, as the owners of entailed estates in Scotland are already enabled to do by the Act of the 10th year of Geo. III., c. 51, known as the Montgomery Act.

Dr. G. G. Zerffi commenced a series of ten lectures on Mediæval History at the Literary Institution, Southampton-buildings, last evening. The lectures will be continued every Thursday evening at 8 o'clock. Fee for members 1s., non members 3s. the course.

The Surveyor.

INSTITUTION OF SURVEYORS.

AT the usual fortnightly meeting on Monday evening last, held at the rooms of the Institution, No. 12, Great George-street, Westminster (Mr. R. C. Driver in the chair),

Mr. E. Ryde read a paper on

PAROCHIAL ASSESSMENTS.

This paper contains a description of the various kinds of property in respect of which poor rates are levied, and the manner of valuing that property for the assessment. Property, to be expressly liable to the poor rate under the statute of Elizabeth, must be "locally within the parish;" "visible within the parish;" and, "productive of a private profit within the parish."

Briefly, it may be described as—

1. Lands (in occupation) in the parish.
2. Houses (in occupation) in the parish.
3. Tithes impropriate and propriations of tithes arising within the parish.
4. Coal mines (in occupation) in the parish.
5. Saleable underwoods in the parish.

All the lands in occupation in a parish, except woodlands, are rateable; but the word "lands" in the statute does not appear to carry the usual legal meaning of that word, because it cannot include houses, as they are separately referred to therein. The words "lands and houses" together have been held to include all descriptions of landed property used for any purpose above the surface of the ground, excepting that of growing wood and timber. These products of the land have always been held to be exempt, because "saleable underwoods" are specially made liable.

In the same manner, as regards things below the surface of the soil, the Courts of Law have always held that all mines, other than coal mines, were intended to be exempted from poor rate, because "coal mines" are specially by name made liable. (Rex v. Sedgley, 2 B. and A. 73.

This specialty has raised a difficulty. It has been necessary for the courts to determine where land, which is rateable, ended, and a mine, which is not rateable, began. In the case of Rex v. St. Austell (reported in 5 B. and A. 693), it was held that a part of the produce of a mine (not a coal mine) reserved to the owner was subject to the rate; not as a mine, but as a reservation of the soil or land itself, and the owner was held to be rateable as occupying the land. In the case of Rex v. Sedgley, Lord Tenterden thus described the difficulty he felt in attempting to reconcile the judicial dicta on this subject. "The whole mine not being a coal mine is exempt. If the owner works the mine and takes the whole produce, he is not rateable for it, either as mine or land. If he lets it to an occupier, reserving a rent, the occupier is not rateable for it, either as mine or land, nor is the owner liable, no one being rateable for a mere rent. But if the owner lets it, reserving a part of the produce, that part is held to be land, although the whole mine, or the whole of its produce is not land, and the owner is rateable for this part of the mine as occupier of land though he would not be rateable for it if he occupied and worked the whole and took directly the whole produce."

In the case of Rex v. Earl Pomfret (5 M. and S. 139), it was held that ore of a lead mine, reserved by the owner, which had to be smelted before it was rendered, was not a portion of the soil, and not subject to the rate. And in the case of Rex v. Tremayne (4 B. and A. 162), it was held that where the reservation to the owner was the value in money of a portion of a mine, other than a coal mine, the owner is not rateable for that.

In the case of the Telargoch Mining Company v. S. Asaph Union, it was held that the appellants were rateable to the poor rate in respect of the occupation of a stream which they had diverted from its natural course for the purpose of working the machinery connected with a lead mine which was not rateable. The water-course was about a mile and a half in length, being partly open, partly tunnelled, and for about 350 yards in pipes. The company were owners of part of the land occupied by the water-course, and part of it they rented. The land was held to be enhanced in value by its capability of conveying water, and not exempt from rateability by reason of its connexion with a lead mine.

Operations involving the consumption of the body of the soil itself, but which do not amount to mining, render the land operated on subject to the rate. For example,—stone quarries, lime works, slate works, salt works, potteries, brick fields, pits of Fuller's earth, sand, marl, and gravel, have all been held to be rateable; but, with this distinct qualification, that if the minerals cannot be got without involving a mining operation, then they are not rateable.

To enumerate all the purposes for which lands can be so occupied as to be rateable, would, in these days, almost amount to an impossibility. There are lands used for agricultural purposes, accommodation lands, building lands, railways, private roads and ways, canals, reservoirs, docks, gas-works, water-works, markets, yards, wharves, bleaching grounds, fisheries, &c.

As regards navigation and fishing, a mere right over the water without an interest in the land is not rateable.

The right of shooting over land occasionally complicates questions concerning the rateability of the respective occupiers of the land and the shooting. It was clearly laid down in the case of the Queen v. Battle Union (L. R., vol. 2, p. 8) that, where an owner retains in his own occupation woodland, but lets the right of shooting over it with a neighbouring mansion, he is rateable for the land and the shooting, on the ground that the right to take game is an incident to the occupation of the land, and that he derives a benefit not from taking the game himself, but from a pecuniary recompense made to him for allowing some one else to take it. His occupation of the woodland is productive to him of a value enhanced by the rent which he receives for the shooting.

The case of Reg. v. Thurlstorn was of a different character. The landowner had let a farm to one man, and had granted the right of shooting over the farm to another. It was held that the occupier of the farm is to be rated only for the bare occupation of the land. (28 L. J. M. C., 106.)

The right of shooting alone without the occupation of land, or without connexion with some rateable subject, is not rateable. This was decided in the case of the Overseers of Hilton and Wakefield, and the Overseers of the Township of Bowes. (L. R., v. 1., p. 359.) It was there laid down, that, in order to make a person rateable to the poor rate, he must be the occupier of some subject matter which is itself rateable; but the rateable value of the subject matter may be enhanced by something which is incident to the occupation, though not in itself rateable, such as the right of shooting. The case was a very peculiar one. The wastes of a manor had been converted into a stinted pasture under an inclosure award; but, the rights to minerals and of shooting were left in the lords. Thus the right of shooting has been severed from the ownership, as well as the occupancy of the soil.

Springs of water are rateable in the sense that they enhance the value of the lands in which they arise. In the case of R. v. Miller (3 Cowp., 69), Lord Mansfield said,—"The value of the four acres of land arises partly from the building and partly from the spring that produces the mineral water." In the case of Rex v. New River Company, the land in the parish of Amwell was of the value of £5 only; but it had a spring in it, which enabled the company by means of pipes to bring water to London, and which increased the value of the land. The land with this spring in it was therefore rated at £300, although the water alone would not have been rateable at all, and the land alone would only have been rated at £5.

The rateability of "lands" may be fairly summed up by the "rule of thumb" of our ancestors, viz., that everything in the parish which can be seen is rateable except woods, other than saleable underwoods, provided always that there is a beneficial use and occupation made of them, and that they do not belong to the Crown.

"Houses" being expressly mentioned in the Act, in the same way that coal mines and saleable underwoods are mentioned, it might have been supposed, as in the case of other mines and other woods, that houses only are rateable—and other buildings exempt. But, if ever such a construction has been contended for, it has not been held to be law. All houses, whether the dwellings of man, cattle, or animals, are subject to the rate. So are barns and granaries for the housing of corn or produce, warehouses, light houses, machine houses, and the like. So also are kilns, furnaces, factories, mills, bridges, and erections of every kind, with the following exception, viz., property occupied for the purposes of the Crown. Neither the Crown, nor the King, nor the Queen, being named in the Act of Elizabeth, is bound by the Act; and it has been held to follow that lands or houses occupied by the Crown, or for the purposes of the Crown, are not liable to be rated. This principle exempts from rates not only Royal palaces, but also the offices of the Secretaries of State, the Horse Guards, the Post Office, and many similar buildings. Police Courts, County Courts, and even county buildings occupied as lodgings at the assizes for the Judges, have been held to be exempt on the ground that, in effect, the Crown is in occupation by public servants, carrying out the purposes of the Government of the country. The Queen is the fountain of justice to all subjects of the realm, and buildings which are necessarily occupied for the purpose of administering justice and cognate objects are within the exception, as buildings really occupied for the discharge of duties arising out of the prerogatives of the Crown. The Queen v. S. Martin's, Leicester, (L. R., Vol. 2, p. 493.) The Queen v. Castle View, Leicester, (L. R., Vol. 2, p. 497.)

Rut, nevertheless, in the case of the Justices of Lancashire and the Overseers of the Township of Cheetham (Law Reports, Q. B. Cases, Vol. 3, p. 14), it was held that buildings used as courts, lodgings for Her Majesty's Judges and other officers, lock-ups, and all other accommodation necessary for carrying on the civil and criminal business of the assizes, but out of which a profit is made by letting portions of such building to the corporation of a town, notwithstanding the corporation use the building for public purposes, are liable to be rated in respect of, and to the extent of the profit received, whatever the occupation may be.

Churches, chapels, and other places exclusively appropriated to public religious worship are also exempt. But the exemption does not apply to any part of such churches, chapels, or premises which are not so exclusively appropriated, and from which parts not so exclusively appropriated some person receives rent, or derives profit or advantage. (3 & 4 Wm. IV., ch. 30.)

Tenements and hereditaments including lands, which are the property of and in the occupation of a municipal corporation in which the limits of the parish are co-extensive with the limits of the city or borough, and in which city or borough the poor are relieved by one entire poor rate, are exempted from poor rates, because it was considered that the imposition of the rate on the borough property would be of no advantage to the borough, as the same parties would be both receivers and payers of the rate (4 & 5 Vic., ch. 48). But, although this view was correct as regarded the particular parish or borough, yet, if such parish now forms one of a union of parishes assessable to the common funds of the union, according to the rateable value of the property comprised therein, under the Union Chargeability Act, 28 & 29 Vic., ch. 79, there are reasonable grounds of complaint on behalf of the other parishes in the union, as the exemption of the corporation property in the one parish disturbs the equality of the basis upon which the contributions of the several parishes are founded. Notwithstanding this, it has been held in the case of the Queen v. Mayor of Oldham (L. R., Q. B. Cases, Vol. 3, page 474) that such property is still exempt, so that it is probable that the question will be litigated again, and this particular exemption will soon be abolished.

Societies established exclusively for purposes of science, literature, or the fine arts, are specially exempted by statute from county, borough, parochial, and other local rates; provided, nevertheless, that each of such societies shall be supported, wholly or in part, by annual voluntary contributions, and shall not, and by its laws may not, make any dividend, gift, division, or bonus in money unto or between any of its members; and provided also that it obtain a certificate from the barrister appointed to certify the rules of friendly societies (6 & 7 Vic., ch. 36). But it has been held that the statute exempts the society and not its property; so that, if the society is rated, its members must appeal (Q. v. Justices of Birmingham, 18 L. J. R. M. C. 83).

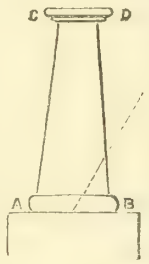
The Linnæan Society, incorporated for the cultivation of the science of natural history and for the promotion of every kind of improvement in arts and sciences, has been held to be exempt (Linnæan Society of London v. S. Anne's, Westminster, 23 L. J. R. M. C. 148). So has also an

institution for the collection and maintenance of a library of books for the use of the members and of persons who subscribed for the occasion only. But an institution established partly for the amusement of its members, such as a concert-hall, built and supported by subscription; or a library, a part of which is applied to the reading of newspapers, is not exempt (Q. v. Brandt, 20 L. J. R. M. C. 119; Q. v. Gaskell, 21 L. J. R. M. C. 29; Russell Institution v. S. Giles'-in-the-Fields, 23 L. J. R. M. C. 65).

(To be continued.)

STABILITY OF TOWERS AND CHIMNEYS.

LET figure represent a chimney shaft which is subject to the action of the wind, and let it be required to find the strain and stability with regard to the section A B. The force of the wind will tend to overturn the shaft, as shown by the dotted lines.



Let A = area of vertical diametral section A B c d.
P = pressure of wind per unit of surface.
h = Height of centre of gravity of diametral section from A B.
P = total pressure on shaft.
M = moment of pressure at A B.

Then for square chimneys,

$$P = p\,A$$
$$M = P\,h = p\,A\,h$$

and for round chimneys,

$$P = \frac{p\,A}{2}$$
$$M = \frac{P\,h}{2} = \frac{p\,A\,h}{2}$$

To find the stability of the shaft, we must multiply its weight by the leverage with which it acts. This leverage is evidently equal to the horizontal distance of the centre of gravity of the shaft from the edge on which it would revolve if overturned, which is the edge opposite the side of the shaft which is subject to pressure:—

Let S = moment of stability.
W = weight of a cubic foot of the material.
n = content of structure in cubic feet.
d = horizontal distance of centre of gravity of the structure from the edge on which the shaft would revolve in overturning.

$$S = W\,n\,d$$

but S must never be less than M, hence to find the least value of n we have, for a square chimney:—

$$p\,A\,h \quad W\,n\,d$$
$$\therefore n = \frac{p\,A\,h}{W\,d}$$

and

$$d = \frac{p\,A\,h}{W\,n}$$

For a round chimney shaft,

$$n = \frac{p\,A\,h}{2\,W\,d}$$
$$d = \frac{p\,A\,h}{2\,W\,n}$$

In practice, the strength should greatly exceed the above, when the latter is taken at the actual force exerted by the wind, which, at a maximum in this country, is about 30lb. to 40lb. per square foot. The stability of the shaft should therefore be equal to about 60lb. to 70lb. pressure per square foot.

The weight of brickwork varies from 100lb. per cubic foot to 120lb., according to the quality of bricks and method of laying them.

On Thursday week the Heywood Conservative Club, Bury, was opened. The building, formerly the Independent Chapel, has been converted to its present uses at a cost of £600.

REPORT OF THE COUNCIL OF THE ROYAL INSTITUTE OF BRITISH ARCHITECTS, TO BE PRESENTED TO THE ANNUAL MEETING, MAY 2ND, 1870.

FOLLOWING the precedent established in former years, the Council of the Institute preface their annual report for 1870 by a statement as to the present extent of its membership and its financial condition. In both respects it may be considered a favourable one.

The unusual number of 18 Fellows have been enrolled since the last annual meeting, and it is satisfactory to add that most of those gentlemen have been elected from the list of Associates, whose ranks have been recruited, in their turn, by an addition of 14 new members. On the other hand, the Institute has to record with regret the loss by death or retirement of 8 Fellows and and 8 Associates, besides the withdrawal of two names from the list in accordance with bye-law 28, sec. v. The total number of members of all classes is now 517.

By the death of William Burn, Fellow, the Institute and the profession generally have suffered a severe loss, the nature of which will be best estimated by the memoir of that lamented gentleman prepared and read by Professor Donaldson at a recent general meeting. The names of Henry Garling, Charles Freeman, J. D. Hopkins, and E. B. Lamb, Fellows, of W. A. Moy, and P. Alley, Associates, are also unfortunately included in the obituary of the past year.

In the list of honorary and corresponding members, the Council have to announce four new elections of eminent Italian architects, viz., the Signor Emilio de Fabris and Professor Guiseppe Poggi of Florence, and the Conte Virginio Vespignani, and Cavaliere Professor Luigi Poletti of Rome; the latter gentleman, however, has since died, and a memoir of his life, by Professor Donaldson, will shortly be published in the Institute Transactions.

The present financial condition of the Institute will bear a very favourable comparison with that of former years,—the receipts, in consequence of many liberal contributions to the Library Fund, having been exceptionally large, and the disbursements reasonably moderate, although the latter include a donation to the Architectural Museum, and the entire cost of the conversazione, which may now be reckoned among the "current expenses" of the year. Since the last annual report was issued, investments to the extent of £452 have been made in Government securities. The president, Sir William Tite, M.P., with a munificence which has always marked his long connection with the Institute, has recently contributed £100 to the "Travelling Fund." This sum, together with accumulated interest on the fund since 1866, amounting in all to £127, will now be invested in guaranteed Indian Railway stock. It is to be hoped that, with the addition of future donations, this fund may in time be so amplified that the interest accruing from it will be sufficient to aid the Soane Medallists or other qualified prizemen in their professional studies abroad, without the necessity of encroaching on the ordinary funds of the Institute. The Council cannot refer to this fresh instance of the president's generosity without being reminded of other circumstances connected with his term of office, which will expire with the annual meeting in May. Last year, Sir William received from her Majesty the well-deserved honour of knighthood, and a short time previously, numerous members of the Institute testified their esteem and respect for him by a subscription for his portrait, which is now in course of completion, by J. P. Knight, Esq., R.A.

The subject of the Voluntary Architectural Examination has received the renewed attention and careful consideration of the Council. With the assistance of a committee specially appointed for this purpose, the rules of the Examination have undergone a revision, which, while it has modified them in certain details, has left unaltered the general principles of the scheme, as drawn up in 1866. The Council, however, consider that the labours of the examiners and moderators ought not to be unremunerated, and they have therefore recommended that fees should be paid in future to all the gentlemen who may consent to undertake those arduous and responsible duties. In accordance with the resolutions passed at the closing general meeting of last session, a list of books recommended to the architectural student has been drawn up by Professor Lewis and A. Waterhouse, Fellows, and has been appended to the rules lately re-issued. A form of certificate has also been prepared, and will be granted to those candidates who may pass, or have already passed, in the respective classes of proficiency and distinction. A preliminary examination has also been devised for such students as have been at least one year in an architect's office. The Council feel satisfaction in adding that these arrangements have already induced candidates to come forward for the examination of 1870.

The labours of the Professional Practice Committee have of late been chiefly directed towards the consideration of a request made by the London Builders' Society, that the Institute would aid that Society in drafting certain conditions of contract, which it was proposed should be annexed to specifications and accepted in professional practice. This request has led to several meetings of the committee, and interviews with the London Builders' Society. The details resulting from the discussions on this subject have, however, been so numerous and diverse on their bearings, and have evolved such varied interests and responsibilities, that the Professional Practice Committee consider it expedient to limit their endeavours to a mere definition of those specific heads under which the conditions of a contract might advantageously be framed. As soon as a conclusion has been arrived at on this point, it will be made known.

The Council have not relaxed their vigilance in the important duty of promoting the conservation of ancient monuments and remains. But scarcely a single instance of neglect or threatened demolition has of late been brought under their notice, and they trust this fact may be accepted as an evidence that greater care is now exercised in the repairs and restoration of buildings remarkable for their architectural or antiquarian interest.

The scheme for artistic education of architects, which originated with the Institute, and has since received the co-operation of other societies, has resulted in the establishment of "Architectural Art Classes," under the control of a general committee of management, in which both the Institute and the Architectural Association are represented. A prospectus, giving detailed particulars of the scheme as at present arranged, has been already issued to every member of the Institute; and it is trusted that the obvious benefits which, under efficient care, may be derived from this undertaking will justify the grant of £50 out of the funds of the Institute, made in aid of the formation of the classes above mentioned, at a special general meeting on the 14th March last.

The Board of Examiners under the Metropolitan Building Act of 1855 have held four meetings since the last report was issued. Of 21 candidates who have presented themselves for examination on these occasions, 12 have passed, and have since received certificates of competency to act as district surveyors; a report to that effect having been made, as usual, to the Metropolitan Board of Works.

The Council have, during the past session, held a correspondence with S. Smirke, Esq., R.A., the architect to the new buildings of the Royal Academy, with the view not only of ascertaining whether better accommodation would be provided for the display of architectural designs and drawings at the ensuing exhibition than had formerly been the case, but also of requesting him to suggest to the Council of the Royal Academy the propriety of leaving to its architect members the selection and hanging of such works. In reply, Mr. Smirke assured the Institute that ample space would be provided for the purpose referred to, and that in dealing with it the Royal Academy Council would be much influenced by the advice of such members of their body as are architects. It is to be trusted, therefore, that on the occasion of the exhibition for 1870 there will be no ground for complaint that architecture is inadequately represented, especially if those who follow it as a profession avail themselves of the opportunities thus offered, and send works worthy of their best ability.

The attention of the Council having been drawn last session to the Fine Arts Copyright Consolidation and Amendment Bill, then before the House of Lords, a petition on the subject, praying that the copyright contemplated in the bill might extend to architectural designs, was drawn up by the Council, and presented to their lordships by the Earl Stanhope in June last.

The Council observed with satisfaction that at

the general meeting held on the 14th March last, their recommendation of Mr. Benjamin Ferrey, Fellow, for the award of the Royal Medal of 1869-70, met with unanimous approval from the members present. Indeed, that gentleman's long and zealous devotion to his professional duties eminently qualified him for the honour which, with Her Majesty's gracious approval, is now to be formally conferred on him. In the competition for medals and prizes of the same year, the drawings submitted by Mr. Ernest C. Lee, to whom the Soane Medallion was awarded, deserved much commendation for the ability which they displayed. It may be mentioned, as further creditable to Mr. Lee, that he was selected by the Council as the Pugin Travelling Student of 1870, from among ten candidates for that honour.

The resolutions passed at the last annual general meeting, with respect to the mode of electing the Council and hon. officers, were not such as appeared likely, on re-consideration, to prove satisfactory in their effect. The Council therefore considered it desirable to re-open this question at a special meeting in the present session, when, after some discussion, another plan was suggested, and formally approved.* By this new arrangement, it is hoped that general satisfaction may be given, and every principle of fairness ensured.

It will be remembered that last year the president contributed a liberal sum to the library fund, for the purchase of a series of drawings illustrative of ancient ecclesiastical decorative painting. The Council have now the pleasure of stating that several of these drawings have been completed by Mr. Geo. Wardle, the artist entrusted with this commission. They will be exhibited at the annual meeting on the 2nd of May.

Among the foreign honours announced in last year's report, as having been conferred on members of the Institute, the name of E. M. Barry, Fellow, was inadvertently omitted from the list of those who were elected members of the Imperial Academy of Vienna. The Council have since had the satisfaction of observing that gentleman's election as a full member of our own Royal Academy.

Adverting to the general prospects of architecture, and the condition of public works in England, the Council have noticed with satisfaction the progress of many important structures recently erected in London, but it is matter of regret that, at a time of severe distress among the building operatives, the Government have not proceeded with certain works recognised as requisite for public service, and the execution of which is called for by the public voice. The delay thus occasioned must, necessarily, have a baneful effect in other directions, and especially on the encouragement of architecture by corporate bodies and private patrons, who are indirectly, but no less surely, influenced by the example of the State.

In the provinces several public edifices have been erected, but they are too well known to need enumeration in this report. The wide-spread interest which has gradually been awakened in the direction of Ecclesiastical Archæology has led to the restoration of our cathedrals and many important churches which might otherwise have perished through apathy and neglect. It cannot, however, be too strongly urged that work of such a nature can only be useful if it be carried on with conscientious care, and with a due regard for the principles of ancient art in their strict integrity. The utmost vigilance is therefore necessary, both on the part of the public and of the profession, to ensure for this movement a satisfactory result.

The improvements recently carried on in the City seemed to afford an excellent opportunity for securing a space unoccupied by buildings on the west flank of the Mansion-house, and for giving additional width to Charlotte-row. With this object in view, memorials from the Institute were addressed to the Metropolitan Board of Works, and afterwards to the Corporation of the City of London. But the extreme value of land in that thronged and commercial district rendered such a sacrifice to pecuniary interests impossible, and all that can now be said is, that the Council have done their best to obtain what they conceived would prove both artistically and practically advantageous to a capital of far larger size and importance than many in which (through the judicious administration of foreign Governments) similar concessions have been made. It may, however, be added that the width of Charlotte-row has been increased to a greater extent than was originally contemplated.

The efforts made by this Institute to aid and ensure the satisfactory execution of the general scheme of the Thames Embankment, and the lines of approach connected with it, are fully set forth in the suggestions submitted to the Metropolitan Board of Works and published with the report of the Council for the year 1862. How far those suggestions have been deemed worthy of attention on the part of the authorities, and with what result, may be seen by a comparison of the plan proposed in this document, with the works themselves, as executed.

The administration of the Department of Public Works has obviously suffered by the appointment of Mr. A. H. Layard, our hon. member, as British Minister at Madrid, and his consequent retirement from the office of Chief Commissioner is a loss to the interests of architecture and the fine arts generally. It is sincerely to be trusted that whatever principles of public economy may be advocated by Her Majesty's Government, they may not degenerate into parsimony (which too often entails a heavy burden of expenses on the future), and that whatever course may be adopted under the present system, those who are in authority will not forget that to encourage the arts of a great empire is not only to administer to its intellectual enjoyment, and to develop its taste, but also to foster its science, its industry, and commercial welfare.

SUBJECTS FOR MEDALS AND PRIZES, 1870-71.

Royal Medal.

Her Majesty having been pleased to grant her gracious permission for the royal medal to be conferred on such distinguished architect or man of science of any country as may have designed or executed any building of high merit, or produced a work tending to promote or facilitate the knowledge of architecture or the various branches of science connected therewith, the Council will proceed in January, 1871, to take into consideration the appropriation of the gold medal.

At the special general meeting held on Monday, the 14th March, 1870, the following recommendations of Council with reference to the medals and prizes for the year 1870-71, were read and agreed to:—

DESIGNS.

Soane Medallion.*

That the Soane Medallion, and, under certain conditions, the sum of £50, be awarded for the best design, well illustrated by a sufficient number of drawings, for the following subject:—

"Royal Stables, with the following accommodation:—Residences for the Master of the Horse, Veterinary Surgeon, and other officers; stabling for 200 horses; an infirmary, riding house, and exercise grounds attached."

The drawings to be in sepia or Indian ink.

The general plan (showing the whole of the grounds) to be as large as a sheet of double elephant paper will admit. Plans of parts to be drawn to a scale of 1-16th of an inch to a foot. It will be deemed sufficient if two plans of the buildings besides the general plan; elevations and one section drawn to ⅛in. scale; with one perspective view and one sheet of details—in all 8 drawings—be supplied.

The further award of £50 will be made to the successful competitor upon satisfactory arrangements being made for his going abroad for a period of six months to pursue his architectural studies within two years after receiving the medallion. The £50 will be paid in two instalments of £25 each; the first when the Soane medallist leaves England for the continent, and the second when he shall have submitted to the Council satisfactory evidence of his studies abroad, in the form of drawings and sketches, after an absence of six months.

DRAWINGS.

That the Silver Medal† of the Institute, with Five Guineas, be also awarded for the best illustrations, geometrically drawn from actual measurement (with dimensions figured, both on the drawings showing the general arrangements and on the details), together with descriptive particulars, of an abbey gateway, a bridge, or other building of importance—classical or mediæval—in the United Kingdom or abroad, hitherto unpublished in that manner.

The Council suggest the following as being subjects worthy of illustration, but others may equally well be taken, if more convenient to the competitor.

Ireland	Cashel Cathedral.	} or any Monastic or Conventual Building.
"	Limerick Cathedral.	
Middlesex	Park Front, Bridgewater House, Green Park.	
"	Front of Dover House, Whitehall.	
"	All Hallows, Barking.	
Nottinghamshire	Steeples of Grantham and Newark.	
"	West Front of Newstead Abbey.	
Scotland	Dryburgh or Melrose Abbey.	
"	Monastery at Iona.	
Shropshire	Lilleshall Abbey.	
Surrey	Lambeth Palace and Library	
Yorkshire	Kirkham Abbey Gateway and Cloisters.	
Wales.—Glamorganshire	Margam Abbey.	
" "	Neath Abbey.	

The drawings to consist of at least one plan drawn to the scale of 1-16th of an inch to the foot, an elevation and a section, drawn to the scale of ¼in. to the foot, with details to a scale of ½in. to a foot, and mouldings one-fourth full size. The elevations to be in line without shade lines, the plans and sections to be tinted in sepia. Perspective drawings may also be sent, and may be tinted in sepia or Indian ink. The jointing of the masonry is to be particularly marked, together with the mode of construction and materials used.

It is strongly recommended that the rough drawings be plotted on the spot, and sent up to the Institute with the fair drawings.

ESSAYS.

Institute Medal.

That the Silver Medal of the Institute be awarded to the author of the best essay on the following subject:—

"On the principles which should govern the Decoration of a Suite of Apartments in a first-class Town Mansion, and on those applicable to the same purpose in a Country Seat, including in each case the entrance hall, staircase, &c."

A medal of merit may be awarded for any other essay or essays, if deemed worthy, upon suitable subjects selected by the authors themselves, without limit of number.

All the essays to be written *very legibly* on alternate pages of lined foolscap paper, and to be accompanied by suitable illustrations.

STUDENTS' PRIZES.

(For students of the Institute only.)

Designs.

That the designs submitted in competition for the Students' Prize in Books, for the year 1870, be one or more of the following:—

A Conservatory, 100ft. long—A Staircase for a Roya Palace—A Ventilating Turret or large Smoke Turret (200ft. high) to an extensive Range of Buildings—A Drinking Fountain—A Gaselier for a Theatre—A Gas Standard for 5 lights.

The drawings to be executed to any scale. The plans and sections to be tinted in sepia, and the elevation to be in outline, sepia, or colour. Perspective drawings are not necessarily required, but may be sent in outline, or tinted in sepia or Indian ink.

MONTHLY SKETCHES.

The subjects for these sketches are to be at the option of the student. Attention is requested to their being forwarded to the honorary secretaries, at or soon after the end of each month, and to their being properly attested by some well known architect as the production of the candidate.

The sketches to be made from actual buildings, or from casts, or other examples in relief.

Any student may send a study or studies from the human figure, provided only that the said studies do not exceed in number one half of his architectural sketches.

All the sketches to be at least as large as a half sheet of imperial paper will admit.

They may be in outline only, or tinted in sepia or Indian ink, or coloured.

DIRECTIONS FOR COMPETITORS.‡

Each essay and set of drawings is to be distinguished *only* by a motto, *without the name of the author attached;* and is to be accompanied by a letter, sealed with a *blank seal,* and having on the outside the same motto as that attached to the essay or drawings, and enclosing his name, with an address to which a communication may be sent. The packet, directed "To the Honorary Secretaries of the Royal Institute of British Architects," and marked Essay for Medal (or) Drawings for Medal (Motto), is to be delivered at the Rooms of the Institute on or before the 31st of January, 1871; carriage and all expenses paid.

The names of the successful competitors alone will be made known.

Should none of the essays, drawings, subjects, or buildings respectively be deemed by the Institute of sufficient merit and importance to deserve the distinction of the premium offered in each case, they reserve to themselves the right of awarding such other premium in lieu thereof as they may deem fit, or of withholding it altogether; and if the best essay or drawings should be by a candidate who has been successful on a former occasion, they reserve the power of adjudging such other reward as they may think fit, and of awarding the medals to the second in merit. All essays and drawings will be returned to all the candidates on application, to the unsuccessful after the adjudication, and to the successful after the presentation of the medal.

Copies of the premiated essays and photographs of the perspective views or principal drawings to which a prize is awarded will be required to be furnished by each of the successful competitors for deposit in the Institute Library before Midsummer, 1871.

PUGIN TRAVELLING STUDENTSHIP.

Candidates for the above studentship are requested to send in their applications, together with specimens of drawing, testimonials, &c., as required by the Deed of Trust (copies of which can be obtained at the Institute), on or before 31st January, 1871.

Extract from the Schedule appended to the Deed of Trust.

"Every person of whatever nation shall be eligible as student who shall be more than eighteen and less than twenty-five years of age, provided that he give to the electors satisfactory evidence of his moral character, and satisfy them that he is a student of architecture, *bonâ fide* intending to practise the profession of an architect, and that he exhibit specimens of his drawings and state the district of the country which he proposes to visit and the class of buildings which he intends to study."

John P. Seddon, Hon. Sec.
Charles L. Eastlake, Assist. Sec.

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* The following are the new regulations:—

"The balloting list of the Council shall be sent round to all Fellows of the Institute six weeks before the annual general meeting. Should any additional name or names be proposed for election by any two Fellows, such name or names must be sent by them to the Council four weeks before the annual general meeting, with a written undertaking by the nominee or nominees to serve if elected. Such name or names shall then be added to the said list, with the names of the proposer and seconder appended, and the list, thus supplemented, shall be re-issued to all Fellows two weeks before the annual general meeting."

* The competition for the Soane Medallion is open to all members of the profession under the age of 30 years.

† This medal is open to all members of the profession, without limitation as to age.

‡ Strict compliance with all the above directions is required.

THE BUTTER WALK, DARTMOUTH.

WHEN we first visited Dartmouth we were not a little surprised to find it such a singularly continental-looking town. Hemmed in with precipitous hills, almost to the concealment of its harbour entrance, the centre of the town appears to lie in a nearly complete valley. Old fashioned pinched-up streets totter along the steep acclivities, connected here and there by flights of steps, the pavement of one street appearing on a level with the chimney tops of the other, whilst projecting stories, and still further protruding gables, greet their neighbours over the way.

Possessing a sheltered and convenient haven, close upon the Atlantic, and a soil of abundant fertility, amid charming scenery, it became the seat of considerable commerce, and an abiding place for wealthy traders of the good old times. One of these merchant princes is stated to have erected for himself and four daughters the five ancient dwellings now called the Butter Walk, two of which form the subject of one of our illustrations. The fronts bear the dates 1635, 1640, just that period when Elizabethan was resolving itself into the Italian architecture, as introduced by Inigo Jones. In their prime they must have been unique, with their half-timbered fronts, wooden sculpture, and pargetting. Only two of the gables now remain, much of the carving has disappeared, and the exteriors are either stuccoed over, or vertically slated. Still, the façade exhibits many beautiful features of old English Domestic architecture — amongst others three projecting windows, supported on vigorously carved oak consoles, representing the rampant lion and unicorn, the sphinx, and other chimeras, together with richly carved friezes and window jambs.

The first floor and fronts are borne on stone columns, which project over the footpath. The ceilings of the upper floors are very elaborate, and one of the principal rooms, which has the royal arms carved over the mantel, is said to have been the reception room of King Charles I.

O. W. D.

BUILDING NEWS SKETCH BOOK.—XXVI.

Peterborough Cathedral.—View of North-Western Towers and Transepts.

THE Cathedral Church of Peterborough, though inferior in size, richness, and multiplicity of parts to several others in this country, yet claims a high place amongst them all in respect of its antiquity, its stately architecture, and its present beautiful state of preservation; of those forming the 2nd class of English cathedrals, it decidedly ranks the first; indeed, the magnificent west front is allowed by all to have no equal in the kingdom.

The present structure was first commenced by John de Sais, on the 8th March, A.D. 1117; it is not recorded how much this abbot completed, but only that he worked at the choir; the next abbot, Martin of Bec, proceeded with this portion and finished it; he also extended his works into the north and south transepts, as these portions are of the same date as the choir itself; it is stated that the works were never relaxed during the first ten years of his abbacy. William of Waterville succeeded next. To this abbot is attributed the completion of the north and south transept of the church; building of central tower (which was taken down soon afterwards and rebuilt for safety); he also erected part of nave, which was finished by Abbot Benedict about the year 1193. Here we have an example of Norman painted roof, which was no doubt placed in its present position by this abbot. To Benedict succeeded Andreas, who it is supposed produced the portion called the western transept, &c. The north-west transept towers and upper portion of western transepts were possibly completed much later by Richard de London, about the year 1270.

It is a matter of surprise that we have no record handed down to us of the exact date when the magnificent appendage of the western front was erected, though it must have been about this time, as this part, and the towers, &c., are all entirely built in the purest Early English style.

Many alterations and additions seem to have taken place in the church, during the time when the Decorated style was prevalent in England; but the last addition to the building, of any consequence, was that portion eastward of the choir; it has, since the demolition of the original Lady Chapel, been usually called by that name. This beautiful Perpendicular example was added by Abbot Kirton, about the year 1440. Amongst the more modern additions and improvements are the present stalls in choir, and new organ loft, &c.; these were executed under the direction of Mr. Blore, architect.

Having glanced at the history of this noble building, from its foundation to the present time, we will proceed to give a brief description of this architectural composition. The present building bears marks, more or less clearly defined, of eight different periods of construction; Roman being the earliest and most conspicuous in nave, choir, north, south, and western transepts. In this latter portion it is carried up about 2ft. higher than the moulded string course, above the clerestory of nave, where it is joined by Early English work; from this point rises the beautifully proportioned turrets, which flank the fine gables in the north wall of transept. It will be seen that this portion is coeval with the towers above it, and also the west front, so that, most probably, these parts were erected at one and the same time.

In the Decorated period, we have the insertion of lower windows in transepts, which are very good specimens of early cusped tracery. About this time, the additions of spires, &c., to north-western towers was completed. On examining the windows of Norman design, it will be seen they have been filled with Perpendicular tracery of very questionable design; this was carried into execution for the purpose of enriching them with stained glass, which has not as yet been carried out.

Students visiting this cathedral will be struck with the remarkable fineness of the masonry in the Early English parts of the building. This beautifully executed work is unsurpassed in any other of our English cathedrals.

Thomas Cox.

THE LONDON CORN EXCHANGE COMPETITION.

WE understand that thirteen sets of drawings were sent in on the 30th of March last, by thirteen different architects, in reply to the invitation of the Corn Exchange Committee for designs for rebuilding the Old Corn Exchange, Mark-lane. The Committee declined to admit the public to see the designs, and have refused to allow members of the press to take particulars of the drawings for the purpose of publication. We would submit to the Committee that by this refusal they commit an injustice to the competitors, and we hope that their resolution upon this subject will be rescinded. The competition, although private in its arrangement, is for what may fairly be considered a public building. A very large number of the public are interested in the decision of the Committee, and it is difficult to see how any inconvenience could arise from the designs being made public, while on the other hand the advantages of publicity are numerous. An independent observer looking at the drawings from an entirely new and unbiassed point of view may bring forward some feature that had been overlooked by those who have only considered the subject from a business standpoint, or may detect a fallacy that was not apparent to others. At all events, by permitting public criticism the Committee would have the advantage of another set of opinions, without being in the least bound to act upon the opinions thus expressed. The competitors have also some cause of complaint. Many of them have no doubt spent considerable time and money upon the preparation of their designs, and are naturally desirous that their drawings should be seen by their friends and acquaintance in company with the rest of the designs, so that the merits of each may be properly appraised.

There is an interest about a competition which is entirely absent from the exhibition of a single design,

A vaincre sans rivaux ou triomphe sans gloire,

and anything that induces a healthy and honourable spirit of rivalry should be encouraged.

The designs are sent in under mottoes, but no secret has been made of the names of the architects who were invited to compete. The following is a list of those who agreed to send in designs, seventeen in all, but some have been prevented from doing so, as only thirteen sets of drawings have been received:—

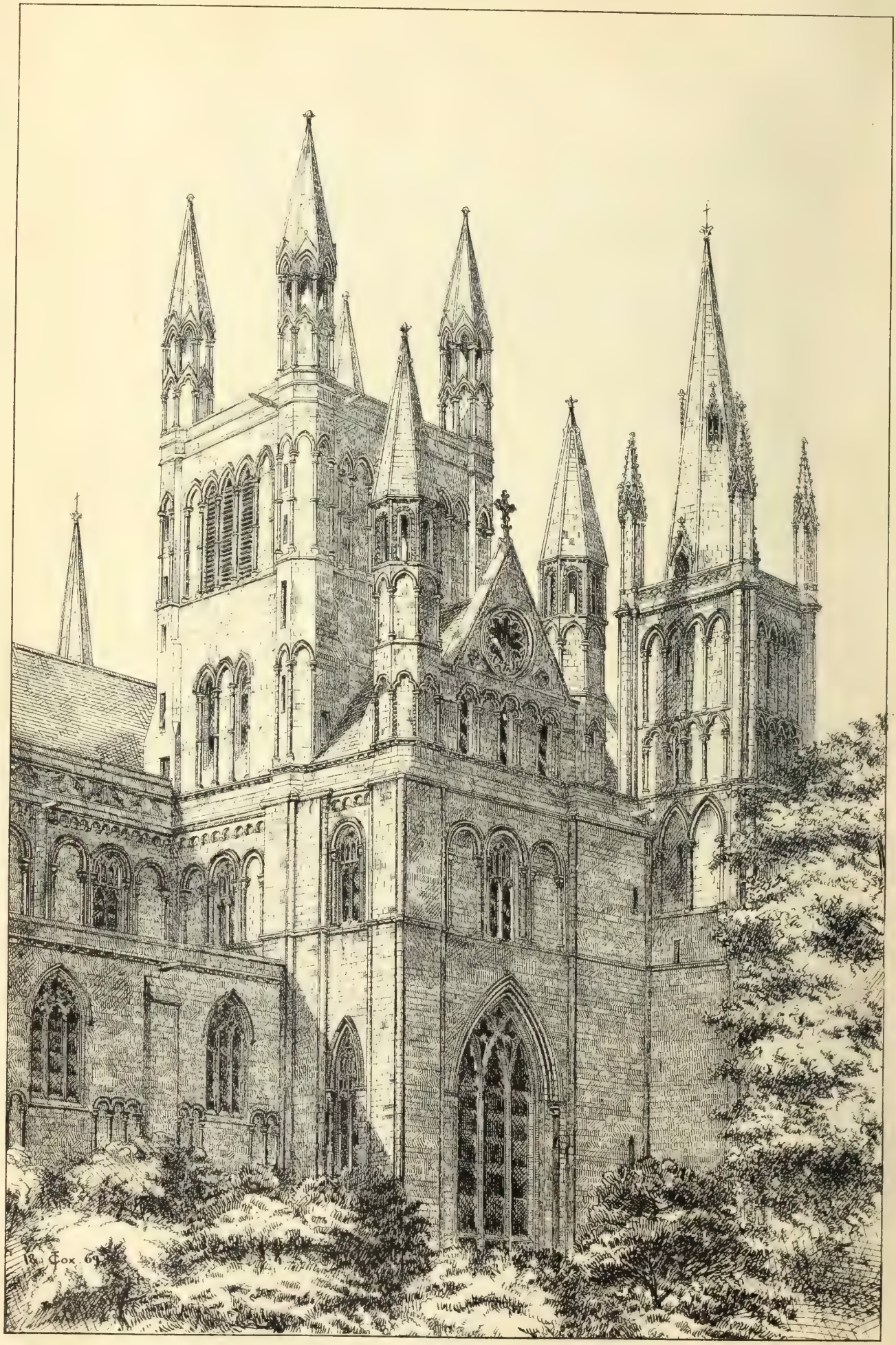
1. Mr. R. Cordy Baxter.
2. Messrs. Banks and Barry.
3. Mr. Cuthbert Brodrick.
4. Mr. W. G. Caldwell.
5. Mr. H. Carr.
6. Mr. W. H. Crossland.
7. Mr. Henry Dawson.
8. Messrs. Giles and Biven.
9. Mr. E. A. Gruning.
10. Mr. Robert Hesketh.
11. Mr. J. Peacock.
12. Messrs. Salter and Wyatt.
13. Mr. Gilbert Scott, jun.
14. Mr. H. Stock.
15. Mr. Taylor (Manchester).
16. Mr. G. Truefitt.
17. Mr. G. B. Williams.

It will be seen that the list contains some good names, and we think our readers will agree with us that their work ought not to be lost to the public.

DON'T CLOSELY COVER YOUR WATER CISTERNS.

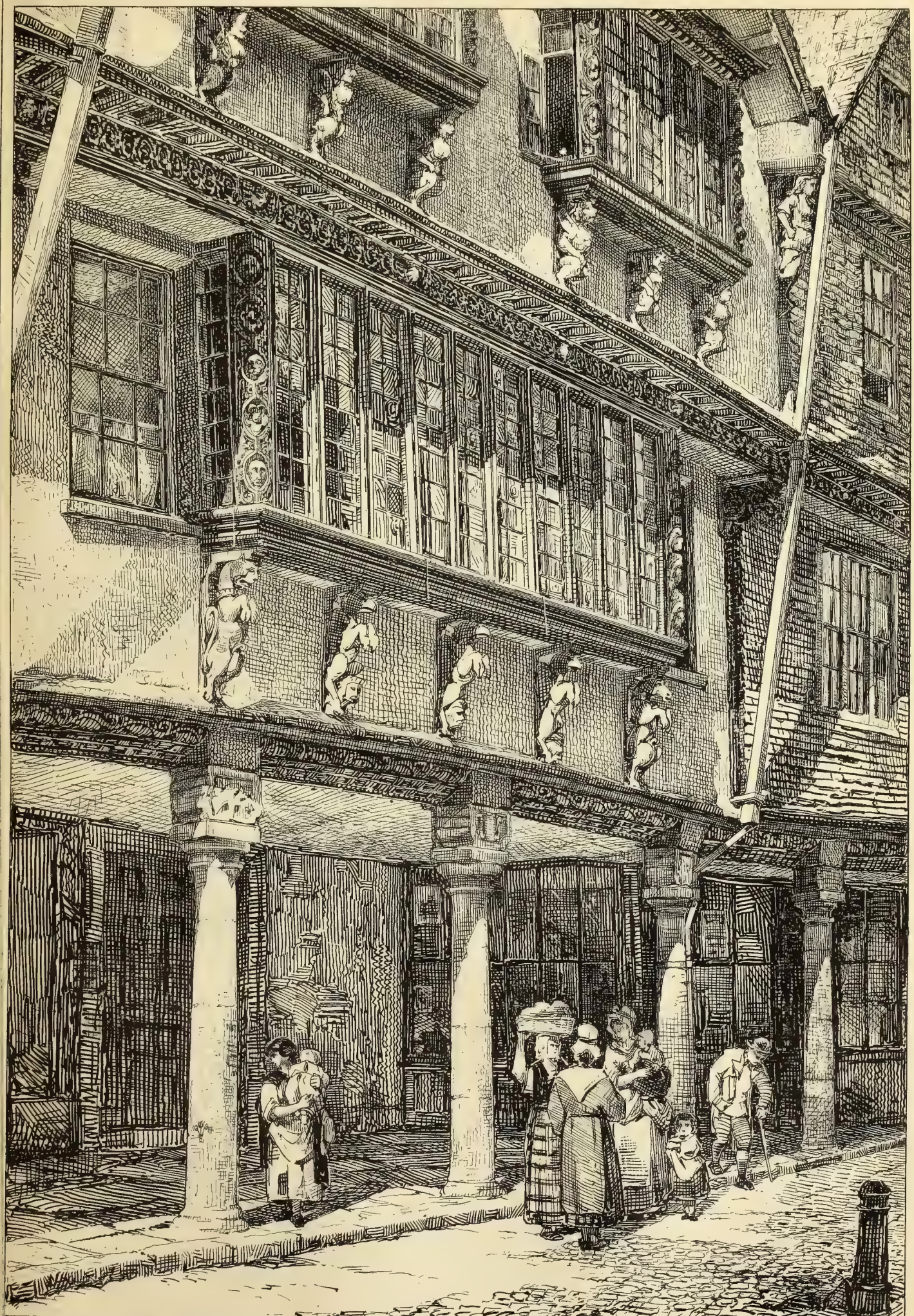
DR. BALLARD, the Medical Officer of Health for Islington, says, "A severe outbreak of typhoid (enteric) fever occurred in the school belonging to the Holborn Union on the rise of Highgate Hill. As I receive no sickness returns from that establishment, I knew nothing of it until twenty-six cases had been received into the London Fever Hospital. My attention was first called to the probability of there being something amiss in the sanitary arrangements of the establishment by the return of a death from "cancrum oris" in the schedule which came to me on March 24th. This death took place on March 18th. The first death from typhoid fever was recorded in the mortuary schedule which reached me on 31st March, that is to say, five weeks after the first recognised case of typhoid had occurred in the house. I mention this because it is a striking illustration of the necessity of weekly returns of public sickness being forwarded to sanitary authorities, as well as returns of deaths. I am morally certain that the disease might have been prevented from spreading as it did in the school had I been in a position to interfere at its first onset. The first recognised case occurred in a boy who was sent to the Fever Hospital on February 24th; afterwards the fever attacked both boys and girls. On visiting the house on March 31st, I found that the children were in the habit of drinking from a closely covered cistern, the waste-pipe of which, untrapped, entered directly into the drain which conducted the overflow of a cesspool communicating with the boys' closet. Both the boys' and the girls' closets, in separate parts of the premises, are defective in construction. Up to the close of the month of March, 31 cases, including a nurse and a washerwoman, had been sent to the hospital. I directed the waste-pipes of the cisterns to be at once disconnected from the drains, and the cisterns themselves to be cleansed and disinfected, and that carbolic acid should be thrown daily into each drain inlet on the premises and used for flushing the closets, and that the night-stools in the infirmary and dormitories should be charged with the same disinfectant. Up to the date of this report only three fresh cases have been sent to the hospital, and one o these patients was ailing at the time of my firs visit. Five cases of typhoid fever with two deaths in a house in the Barnsbury-road have been traced to a similar cause. Householders are scarcely even now aware of the danger to which they are exposed from the stupid but common practice of covering the water cistern and then carrying a waste pipe from the vacant space directly into the house drain, by which this space becomes virtually a receptacle for the foul gases generated in the latter and for any poisonous matter which they convey. The inmates of houses where this arrangement exists are at the mercy of an accident which may happen any day.

Wanton Mutilation of a New Church.—At Abington, Co. Limerick, on Sunday night, a number of men entered through a window into a Protestant church in course of erection, and demolished everything in the way of ornament in the building. A magnificently carved pulpit, which was erected at considerable cost, was almost perfectly destroyed, and the greater portion of stonework in the edifice, particularly that comprising the chancel, was mutilated.



PETERBOROUGH CATHEDRAL View of North West Transept and Towers

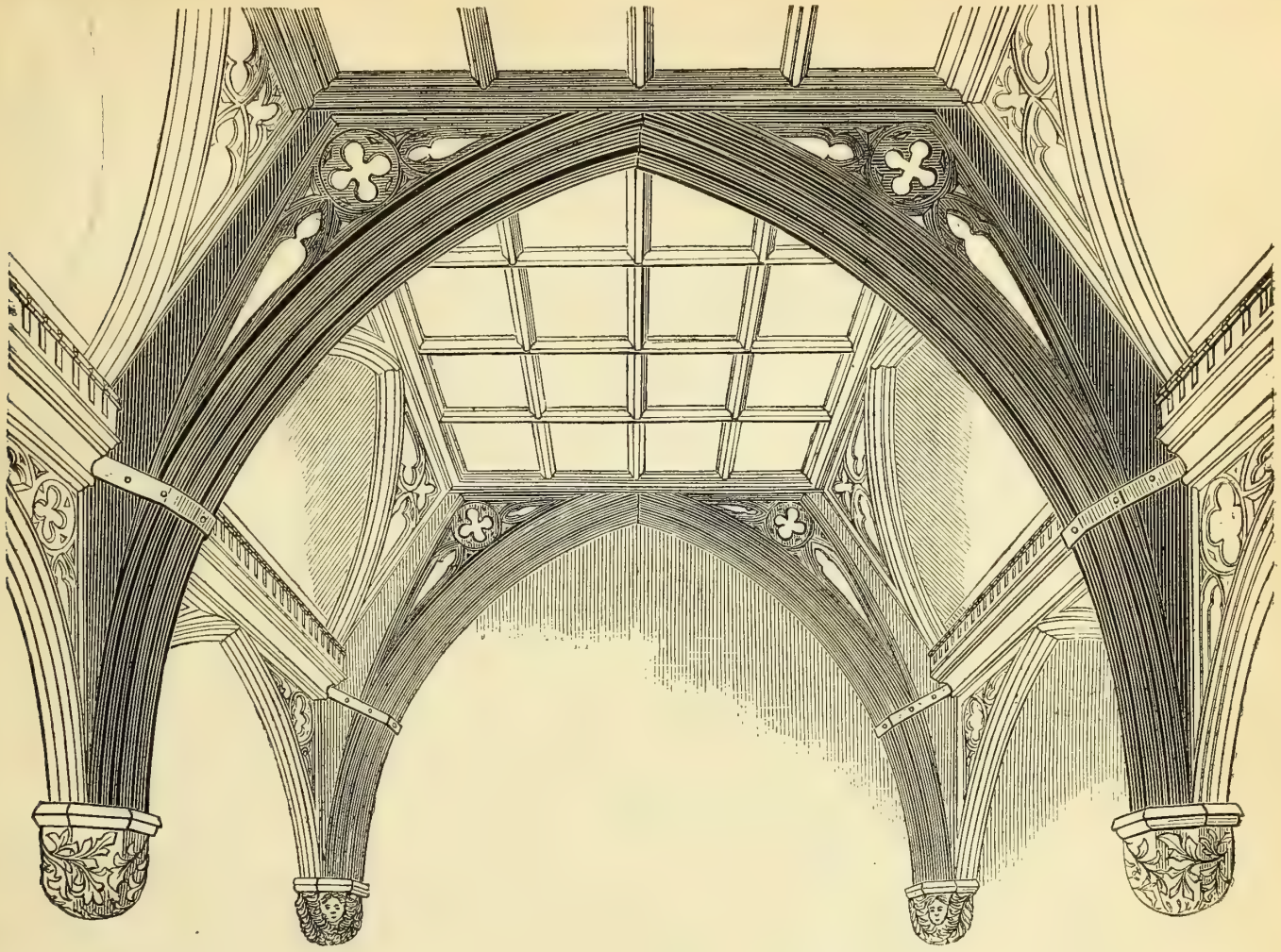
Printed by Whitehead & Bass, London.



THE BUTTER WALK, DARTMOUTH.

wen W Davis del et lith

Printed by Whiteman & Bass



ROOF OF THE GREAT CHAMBER, LAMBETH PALACE.

BRIEF CHAPTERS ON BRITISH CARPENTRY.

By Thomas Morris.

(Continued from page 304.)

THE projecting entrance porch of the one is presented, not in a copy, but a free translation of the other. Similarity may be traced in the great windows, the boldly coped gables, and the effigied apices. Notwithstanding the heavy disfigurements and modern obliterations at Westminster, something of the outline of the flanking towers of the north front has been preserved. Those towers are without buttresses, have level battlemented tops, and at one angle of each the customary octagonal turret, rising some feet higher than the roof of the tower, to which it gave access, is found. Their agreement with one at New College is exact. "It consists of four horizontal compartments, exclusive of the base and battlements, diminishing gradually and almost imperceptibly from the base to the summit, which is ascended by a winding staircase of stone within, terminating in an octagonal turret at the south-west angle. This was perhaps the last production of his mighty mind in Oxford." (Ingram.)

The timber-work, as compared with the masonry, has equal merit and pre-eminent grandeur. It displays a truly wondrous combination of artistic power, scientific skill, and practical experience. It was by itself enough to make a reputation, and that it should have escaped a lasting association with its author's name is most naturally to be accounted for by classing it with the unnumbered successes that formed the base of Wykeham's celebrity. The bishop was among the king's surest and most loyal friends, often entertaining him, together with his queen Isabella and all their court, with the most unbounded hospitality and magnificence. In 1394, the year of the patent to Godmerstone, p. 285, a royal visit was made, July 25, at Wolvesey, and another there and at Farnham in September, when the party dined with the bishop two days in succession at those venerable mansions, the total retinue on one occasion numbering 366 persons.

Where so cordial an intimacy existed opportunities could not be wanting for the attentive discussion of plans and models for the new work. The joyous celebration of its accomplishment, too, may have been intended as homage alike to the famous architect, and this most famous design, while the next reign commenced with circumstances and actors more calculated to throw both into discountenance and oblivion.

I deem it certain that the stone ribs of Ightham and Mayfield were anterior to Westminster, and that both those buildings must have been known to Wykeham, who, on the king's business, and in relation to his archbishop, must have been familiar with the county of Kent. With such models before him he had a sufficient index to the next progressive step. Though not easy to effect, it was clear in purpose and direction. It consisted in the substitution of frames of wood for arches and gables of stone, carrying mechanical science from one material to another, and infusing into carpentry constructive principles that were previously the mason's own.

The roof at Westminster was evidently based on a scheme of equilibration. If, for instance, the line A B (fig. 1) represents the sloping plane of one side of a roof, the centre of gravity will be at C, so that were the plane supported at that part no change of position would occur. If the complemental side of the roof were added it might be supported at a corresponding point, and therefore a roof of such a form might be poised on the supports at C C (fig. 2). Were the sides connected by a horizontal beam D (fig. 3) the middle of that beam would be the centre of gravity for the entire frame. A roof, therefore, constructed according to diagram 4 would be in equipoise, the points C C being supported by the upright posts A A, and these kept in position by the horizontal strut D. Again, it would be possible to substitute for the vertical posts A A compound supports of the form shown at F F, diagram 5, provided the tendency to spread at the angles or joints E E were counteracted. This is in effect the compound support presented by a stone arch, as at Ightham and Mayfield. It would be judicious in the construction of such a roof to have supports at C C, and this will be found to have been followed in practice. D is the point assigned to the apex of the great supporting arch, and the weight at C C is collected by massive purlins with arched supports, as at Nursted. But if the weight were collected and thrown on to the arch at D it would tend to depress the curved rib, and cause it to give way at the sides. By a happy expedient, however, the load was thrown upon the arch at a much stronger point G, in diagram 6, at about one-third of the rib's total length from the springing.

We must now suppose the length of the rafter divided at C, and the weight of the upper part brought by the arch and purlin on to a point E within the arch, while the weight of the lower part of the rafter is transmitted to a point F, at an equal distance from the rib on the outside. These two points are connected by a strong beam, and the joint weight is brought on to the arched rib at G—at either end, half the weight of that side of the roof. Assuming, then, the arch to be rigid and strong, and supported at the feet only, it would bear the nicely balanced superstructure. But to obviate the possibility of vibration F is steadied by the wall, and E by those curved

struts, from above and below, that constitute the gigantic trefoil cusping of the interior; while the crude skeleton is clothed with elegance by the mouldings and tracery, that give at the same time firmness to the work. The walls were kept upright by enormous flying buttresses, the need of which has been in some places superseded by other constructions, but some of the originals remain next the yards of the adjacent Law Courts. The composed stress of the arched oak rib scarcely went beyond the thickness of the walls, as indicated by the oblique line C G fig. 6.

In this way the peculiar design of the Westminster roof may be accounted for on principles accordant with the demands of actual utility, justifying Dr. Young's remark that "the Gothic architects made every essential member of their buildings a constituent part of their system of ornament; and things which, by a superficial observer, might be deemed useless or prejudicial, serve, either by their strength or weight, some beneficial purpose." Here was a new and unexampled adventure—an instance of invention and construction unquestionably arising from the most advanced knowledge of the period—a period, let it be remembered, ten years prior to the death of him in whom such knowledge was most conspicuously centred—William of Wykeham.

Upon no other theory, than as rigid chief supports, can the presence of the great arches be satisfactorily accounted for. They have, it is true, been elsewhere spoken of, in a somewhat perfunctory manner, as arched *braces*, and so degraded to a subordinate office; but it must be allowed that they *appear* to support the weight of the roof; and if they, in fact, perform no such duty, we are invited to contemplate an idle parade of false sagacity and a laborious fabrication that excites admiration only when it deceives. I accept no such solution, and although the load may have ceased to fall with original force and *aplomb*, I look no further for the cause than to the shrinkage and self-adjustment due to the enormous size and complicated framing of these majestic principals.

The Great Chamber at Lambeth Palace.

The carpentry of the fifteenth century, to which I now turn, admits of illustration by well authenticated examples. Of these, indeed, many exist, but the absence of a more ardent and general spirit of conservatism with respect to monuments so deeply interesting for their art treatment, historic evidence, and antiquarian value, is much to be deplored. In this respect, however, I read with great satisfaction a paragraph from the Report of the Council of the Royal Institute of British Architects to the annual meeting, May 2nd, 1870—viz., "The Council have not relaxed their vigilance in the important duty of promoting the conservation of ancient monuments and remains. But scarcely a single instance of neglect or threatened demolition has of late been brought under their notice, and they trust this fact may be accepted as an evidence that greater care is now exercised in the repair and restoration of buildings remarkable for their architectural or antiquarian interest."

The roof of the Great Chamber or Guard Room of Lambeth Palace is a most elegant specimen of artistic carpentry. The form of the arch, the mouldings, and the tracery seem to justify the assignment of this work to the early part of the century; and it is noticed in the steward's accounts in 1433. A battlemented wall-cornice is supported by arches with tracery spandrels, and the principal ribs are also enriched and lightened by perforated tracery. The wind-braces on the sloping sides are treated in a similar way. The stone corbels from which the principals spring are of the compact form, with carved surfaces, allied to an earlier date (I have found them elsewhere with fourteenth century masonry); but we may be sure they are appropriate to the style, whether Mr. Blore, in repairing this room for Archbishop Howley, found any guide for restoration, or simply gave the impress of his own great experience, both as an antiquary and an architect. During those repairs the capability of the roof to stand alone was put to the test, as the walls were taken down, and the roof left dependent on its ribs and arches for support. The strong iron bands were no doubt then attached to the main ribs; but, though somewhat of a disfigurement, they afford evidence of the care with which it was sought to preserve the original material and workmanship; and a valuable precedent is thus brought under the notice of too-active restorers. The Archbishops of Canterbury, like other incumbents, are bound to protect their temporalities from dilapidations; but they are justified in deferring renewals till the latest possible time, and to this wholesome rule we are perhaps indebted for some of the most ancient and interesting remains of ecclesiastical architecture. We are thus enabled to contemplate not only the forms, but the unchanged materials upon which Archbishop Chicheley, to whom this part of the palace is attributed, may be supposed to have gazed with appreciative delight. This great prelate, thirty-eight years later in birth than Wykeham, is said to have known the friendship and to have imitated the example of that distinguished man. Like him, he was an active minister of State, a founder of colleges, and a patron of architecture. He was at times in the camp, and saw the sieges of Rouen, Montereau, and Melun. As diplomatist he visited the courts of Rome and France. As metropolitan he was prudent and discreet, firm and energetic. As a public benefactor we may look to his endowment of two colleges at Oxford and one at Higham Ferrers. His expenditure in repairs, additions, and founding the library at Canterbury Cathedral, was very great; while in the construction of magnificent apartments at Lambeth he has been alone surpassed by Dr. Howley, who is said to have expended there and at Addington, not less than £120,000. Having passed twenty-nine years as primate—a longer term than any predecessor for five hundred years—Chicheley died April 12, 1443, and was buried under the alabaster tomb he had erected in his cathedral.

THE LATE MR. MACLISE, R.A.

MR. DANIEL MACLISE, the well-known Royal Academician, died on Monday. We learn from "Men of the Time" that he was born in Cork, Jan. 25, 1811, was of Scottish extraction, and his father, Daniel Maclise, was an ensign in the Elgin Fencibles. In childhood he showed great talent for drawing, but was placed as clerk in a banking-house in Cork, which, at the age of sixteen, he quitted for a more congenial pursuit. Arriving in London in 1828, he became a student at the Royal Academy, where he laboured with zeal and perseverance, and during his course of study received all the medals for which he competed, including the gold medal twice successively. The summer of 1830 he spent in studying the galleries and studios of Paris, and worked diligently in making designs for booksellers and other persons, and in painting portraits, till 1832. He exhibited his first pictures at the British Institution:—"Mokanna unveiling her Features to Zelica," "All-Hallow Eve," and "A Love Adventure of Francis I. with Diana of Poictiers," in 1833, when his fame was established, and he ceased to paint portraits. In 1835 he exhibited the "Chivalrous Vow of the Ladies and the Peacock," and the Royal Academy elected him an Associate. It was followed in 1838 by "Robin Hood and Richard Cœur de Lion," "Salvator Rosa painting Masaniello," "Merry Christmas in the Baron's Hall," and several other pictures, including the "Banquet Scene in Macbeth," in 1840; "Gil Blas dressed *en cavalier*;" "Scene from Twelfth Night;" and the "Sleeping Beauty;" and in 1841 he was elected R.A. "The Play Scene in Hamlet," a leading attraction in the Vernon Gallery, "The Return of the Knight," and "The Origin of the Harp," were painted in 1842; "Actors' Reception of the Author, Gil Blas," in 1843; "The Lady released by Sabrina from the Enchanted Chair;" a scene from Milton's "Comus," repeated by him in a fresco painted in the summer-house at Buckingham Palace, in 1844; "Ordeal by Touch," in 1846; "The Sacrifice of Noah," and his famous design of Shakespeare's "Seven Ages," in 1847. His later pictures include "The Spirit of Chivalry," and "The Spirit of Justice," both painted in oil and fresco for the House of Lords; certain cartoons of various subjects, such as "Alfred in Guthrum's Tent," and a different treatment of the same subject in oils; "Caxton showing Edward IV. his first Proof-sheet in the Almonry in Westminster;" "Prospero and Miranda;" the wrestling scene in "As You Like it;" "Peter the Great working as a Shipwright in Deptford Dockyard;" "The Marriage of Strongbow and Eve, in ratification of the Conquest of Ireland under Henry II.," his largest and most important picture, exhibited at the Royal Academy in 1854; and "Othello, Desdemona, and Emilia," and "A Winter Night's Tale," exhibited at the Royal Academy in 1867. This artist devoted 1855 almost entirely to a tour through Italy in search of fresco works, and to the discharge of his duties as one of the Fine Art jurors of the Paris Exhibition. Among his smaller works may be mentioned a fine set of 42 drawings, illustrative of the history of the Conquest, exhibited by him in 1856. He had been some time engaged on a series of cartoons to be painted in fresco in the Royal Gallery of the Houses of Parliament, chronologically arranged, with the design of serving as illustrations of the glories of England in war, by land and sea, from the earliest period of our national existence to Waterloo. Of these "The Death of Nelson," and "The Meeting of Blucher and Wellington after the Battle of Waterloo," are engraved on a large scale in line for the Art Union, and a fine picture of the former was in the Royal Academy Exhibition of 1866. After the refusal of Sir E. Landseer in 1866 of the Presidency of the Royal Academy, it was offered to Maclise, who also declined it.

ON ROMAN ART.*

PART II.

HAVING in the previous lectures treated of the differences between Roman life and Greek life, and the consequent differences between Roman art and Greek art, we may now turn to the domestic architecture of the Romans. This was based on the Etruscan style, and was said to have been introduced by Tarquinius Priscus. The first buildings of the Romans were square huts, with a round tumulus at the top serving as a roof. The so-called Palace of Romulus, kept for centuries in its original condition, was probably a construction of this kind. Tiles were for a long time unknown. Bricks dried in the sun were used; but afterwards, fire-baked bricks and tiles were employed. In the beginning of the Republic, when attention was entirely occupied with the enlargement of the Empire, the Romans imitated the Spartan spirit. Art was neglected and despised; everything was simple. But by degrees, when they became wealthy from the spoils of other nations, the love of luxury developed itself, and as far back as 250 B.C., "sumptuary" laws were framed to check the rapidly increasing spirit of pompous ostentation. Their houses at first were only one story high, but with the increase of population they became two stories in height. Augustus passed a law forbidding a higher elevation for houses than 70ft.—that is, about six stories in height. Greek architecture and sculpture were introduced by the Romans about 183 B.C. The Romans now began to construct most magnificent buildings, employing generally Greek architects. Lucius Cassius is said to have been the first who ornamented his house with columns of foreign marble. Once this luxury introduced, it spread rapidly. The house of Lepidus (75 B.C.) was the finest in the city; but thirty-five years later, it formed but one of hundreds of similar or even more splendid mansions. The villas of the Romans were no less luxurious than their town houses. Cicero, who employed a Greek architect named Cyrus, appears to have taken as much care of his villas as of the welfare of the State. More celebrated were the villas of Lucullus and Pollio. This luxury undoubtedly reached in the *aurea domus* (golden house) of Nero, the highest point of magnificence. The study of one Roman house makes us acquainted with all of them, just as the plan of one English house may be taken as representing all other English houses, varying only in the number and dimensions of the rooms. Every considerable house was divided

* Abstract of a lecture delivered by Dr. Zerffi at the South Kensington Museum, April 5, 1870.

into two parts — a public and a private part. The public part was that portion of the house where the patron met his clients and received such persons whom he did not wish to introduce into his more intimate domestic circle, and consisted of a portico, vestibulum, atrium or *cavædium*, tablinum, fauces, and alæ. The *private* parts of the house were the peristyle, bed-chambers, triclinium, picture gallery, library, baths, exhedra, xistus, &c. One of the most important rooms was the triclinium, so called from three beds, τρεις κλιναί, encompassing the dinner table on three sides. The prodigality of the Romans was notorious. Lucullus used to spend 50,000 denarii (about £1600) for one dinner party. The ceilings of the triclinium were often so made as to open, in order to let down a second course of meats, with showers of flowers and perfumed waters, whilst rope-dancers performed their evolutions over the heads of the company. The decorations of these rooms were noble and appropriate to their situation. Garlands of flowers entwined with ivy and vine branches divided the walls into compartments, and in the centre of each compartment were painted young fauns, or half naked Bacchantes, carrying vases, *thyrsi*, and all the furniture of festive meetings. In the dining-room of Scaurus there was, above the columns, a large frieze, divided into twelve compartments, each surmounted by one of the signs of the zodiac, and containing paintings of the meats in season in each month. Under Sagittarius (December), we see shrimps, shell-fish, and birds of passage; under Capricorn (January), lobsters, sea-fish, wild boar, and game; under Aquarius (February), ducks, pigeons, plovers, water-rails, &c. These dining-halls were lit up by bronze lamps depending from chains of the same metal, or by raised and richly-wrought candelabra. The best lamps were fabricated at Ægina, and cost from £20 to £400 each; slaves were specially appointed to trim them. The tables in the dining-rooms were of citron wood (more precious than gold), brought from the extremity of Mauritania. They rested upon ivory feet, and were covered with massive silver, chased and carved, and weighing sometimes 500lb. The couches were of bronze, overlaid with ornaments in silver, gold, and tortoise-shell. The mattrasses were of Gallic wool, dyed purple. Valuable cushions, stuffed with feathers, were covered with woven and embroidered silks, made at Babylon, and often costing £32,000. The baths of the Romans resembled our Turkish baths. They comprised a frigidarium, tepidarium, calidarium, and ambulacrum. All these places were richly decorated. The ceilings supported by pilasters, and the ornaments were appropriate to baths, symbolising water and bathing, and whimsical in invention, such as winged children riding on sea-horses or guiding dolphins. From these remarks we see that the wealthier Romans knew how to live and how to enjoy life, whilst the homeless, houseless masses had their great monuments to gaze at, their small bits of bread, and their glorious games, contenting themselves with witnessing the triumphal entries of their consuls, dictators, or emperors. Of Early Roman monumental architecture we possess but few remains. Such works were executed in a greenish-grey tufa, little adapted for fine detail. An interesting specimen of this period is the sarcophagus of L. Cornelius Scipio Barbatus, belonging to the third century before Christ, now in the Museum of the Vatican, in which the Doric style prevails. The Ionic form is exhibited in the Temple of Fortuna Virilis, which rises on a lofty substructure on the banks of the Tiber. As an example of the early application of the Corinthian style, we have the so-called Vesta Temple at Tivoli, a graceful circular building, surrounded by columns, enthroned on a steep rocky height above the foaming waters of the Anio. In the first ages of the Commonwealth only temporary theatres were constructed of wood. The most celebrated was that of M. Scaurus, described by Pliny, the scenes of which were divided into three partitions, one above the other, the first having 120 marble pillars, the second the same number of pillars of glass, wrought in a curious way, the third the same number of pillars, provided with gilded tablets, and between these 360 pillars there were 3000 statues and images of brass or bronze. The cavea would hold 80,000 spectators. The first stone theatre, however, was erected by Pompeius, and was capable of holding 40,000 spectators. The theatre which Julius Cæsar began surpassed the former ones in magnificence, but was only completed by Augustus, who enlarged and beautified the Circus Maximus, capable of seating 150,000 persons. Up to the time of Augustus Rome was a heap of bricks, but he transformed it into a city of marble. It was under him that Roman architecture acquired its characteristic development. Temples were built or rebuilt. The Pantheon, built by Agrippa, son-in-law of Augustus, was originally intended for a hall in the *thermæ*, but was transformed at its completion into a temple dedicated to the avenging Jupiter. The theatre of Marcellus, begun by Cæsar, was completed 13 B.C. by Augustus. It is now the Palace Orsini. Triumphal gates of this period are to be found at Rimini, Susa, and Aosta; they are all simple in design and execution. Of the Mausoleum of Augustus nothing is left but the substructure, 220ft. in diameter, and now a place for equestrian performances. This period is celebrated because Vitruvius lived in it and wrote his compendium of architecture, in which no arches or vaulted roofs are mentioned, but which furnishes exclusively academical rules for the application of Greek forms. Herod the Great was also a contemporary of Augustus. He had, in Palestine as well as in Greece, splendid buildings executed. He embellished the Temple at Jerusalem, and had its porticos adorned with Corinthian pillars. With the Flavians, 69 A.D., down to the time of Septimus Severus, 193 A.D., the second period of Roman architecture closes. It had its bloom under Trajan, reached its climax under Hadrian, and degenerated again under the Antonines. To this period belongs the Coliseum, a Flavian amphitheatre, begun by Vespasian and finished by Titus. I must mention here the Triumphal Arch of Titus, on the height of the Via Sacra; one single high arched entrance is introduced between firm masses of wall, supported on each side by half-columns upon pedestals, and on these columns the coarser form of the Roman Composite capital for the first time appears. Everything of this period was surpassed in splendour and glorious magnificence by the Forum Trajanum. Its architect was Apollodorus, of Damascus. Here stood the great basilica Ulpia, with five aisles, and next to it a small courtyard surrounded by pillars, in the midst of which the gigantic column of Trajan arose. This column has reliefs in ribbon-like spiral windings round the shaft, containing not less than 2500 figures 2ft. high, forming a kind of historical essay hewn in stone representing the incidents of the Dacian war. The triumphal arch of Constantine, with three gates, is undoubtedly the most splendid monument of its kind. The arch was constructed from fragments of a triumphal arch in honour of Trajan, entirely of Pentelican marble. It is noble in proportion, delicate in execution, but overdone; the tendency to show off is too visible, and mars the real artistic effect of the total. Hadrian constructed the temples of Venus and Roma. These two temples were joined at the back, and their porticos opened towards opposite points. Another tower-like circular structure, built of blocks of travertine, with a diameter of 226ft., based on a quadratic substructure, was the Mausoleum of Hadrian—the present castle of S. Angelo. This immensebuilding was covered with Parian marble, and the summit was crowned with a brazen quadriga. One of the monuments in the purest Corinthian style is the so-called Maison Quarrée, at Nimes. Of the buildings under the Antonines, there are few remains. At this period architecture begins to decline. Its treatment becomes heavier. People are more engaged in discussing dogmatic matters of religion, and heathen art begins to disappear. We have now in general imitations; such a one is the stately column of Marcus Aurelius, which contains reliefs winding round a shaft, and representing his war against the Marcomanni. In this monument there is a want of clearness in the groups; rivers and enclosures of walls are given in the style peculiar to maps, and the whole is devoid of all plastic truthfulness and artistic conception. During this period we see architecture and sculpture dying out. It is a time when military prowess, no more required to extend, but to defend, the vast frontiers of the proud mistress of the world, engages emperors and people, and Rome ceases to be the heart of the Empire; when the provinces begin to feel themselves strong enough to live a life of their own; when we see everywhere dissolution and despair; when a moral change overcomes man, and leads him to seek a better future; when the whole magnificent world of heathenism crumbles into the dust, to be superseded by a totally new mode of feeling, thinking, speaking, and acting; when humanity is to begin anew to construct and to carve its way from a savage state into that of a revived and remodelled form of art; when Christianity apparently stifles art, progress and science to make the highest goods of mankind rise from death in union with the old classical world, and so make them brighter, more intellectual, more general. We approach the time when particularism is to give way to catholicism—that is to universalism. In casting a glance on the vast Roman empire, we find traces of its architectural grandeur everywhere, from the frontiers of England towards Scotland, down to the Euphrates—in Germany as well as in France and Arabia Petræa; everywhere the footmarks of the Roman power are visible. In the East, Roman architecture begins to be crushed by the influence of a fantastic Eastern mind; in the North and South by forms altogether new and striking. Broken gables, surfaces turned at random in and out, arches and triangles, squares and semicircles, used with grotesque variations, form now a peculiar style, called by Dr. Lübke the Antique Rococo. In the midst of the Assyrian desert at Palmyra, the Tadmor of the present day; at Heliopolis (Baalbec, where the sun was worshipped); in the remote rocky valleys of Arabia at Petra—everywhere, temples, theatres, baths, tombs, and triumphal gates, testify to a blending of the late Roman art with the rich fantastic style of the East. Architecture, like sculpture and ornamental art, was, with the Romans, Greeks, and Etruscans, the expression of their national character; joyous and harmonious with the Greeks, crude and gloomy with the Etruscans, and pompous and ostentatious with the Romans. No one can deny that at a certain period of their national existence the Romans followed out with great care the principal law of good decorative art: to impose through harmony a feeling of mighty repose. There is a charm in the productions of the Romans, with their grand decorations, their well-balanced heights, their admirable geometrical bases of ornament; beautiful mouldings, friezes with endless decorations, gorgeous capitals almost bending under the weight of foliage and animals were marshalled up by the Romans like their legions in battle array. All with them was teeming with regularity. They used flowers, leaves, branches, and all sorts of animal and human objects in free imitation of nature for an artistic decorative purpose, but always in the spirit of the object they intended to decorate, and in the manner of the Greeks, who observed the golden cardinal rule of treating every material in general form, construction, and ornament so that one material never assumed the mask of another, but each had its own mode of artistic expression. No wooden pillars painted as marble; no Portland cement with a little plaster of Paris in imitation of Carrara marble; no brass to represent gold; no plated goods to pass for silver; all and everything with the ancients was genuine, substantial, and in accordance with Nature. We approach now a totally different period in art. In Greece, the dynamic force was concentrated on architecture and sculpture, in Rome on conquests and politics; in both countries the stern laws of morals were neglected, and with this neglect, arts, sciences, and the very nations themselves disappear. The balance of the two forces working in humanity was disturbed; they left us their glorious works of a period when they still struggled to establish that balance, and when they most succeeded in doing it. This was especially the case in Greece, where the balance between the moral and intellectual nature of man was established through the feeling of harmonious beauty. This is the reason why Greek poetry, architecture, and sculpture do and will continue to form the root of our artistic development. Christianity now throws its light on humanity, and dazzled by its bright rays we see everything in art and science black, dark, hopeless. But mankind takes in by degrees the new truth through which the disturbed balance between the inner and the outer man, the spiritual and the material world, the moral and the intellectual forces, the static and the dynamic elements, was to be re-established, so as to make us conscious of our superior nature, and to reconcile and to emancipate the spirit in life as well as in art. We begin to strive upwards, detaching ourselves from the broad forms of matter which kept the mind in fetters of mere outer forms. We begin to study more the spirit of man, the sense, the soul of his sublime nature, and to pour into everything we conceive, make, or create a higher, more divine aim.

We shall consider next the early Christian types of art.

Furniture & Decoration.

THE THEORY AND PRACTICE OF MODERN HOUSE DECORATION.

By an Experienced Workman.

(*Continued from page* 278.)

ON THE NATURE AND USES OF THE OILS, VARNISHES, DRIERS, &c., USED BY THE HOUSE PAINTER AND DECORATOR.

Of the oils used in the mixing of paints and the making of varnishes the principal, and in fact the only really useful one, is linseed oil, which is obtained from the seed of the common flax by contusion and expression. In colour it is a pale yellow-brown, which darkens and thickens on exposure to air. There are two methods of preparing it—the one by the cold process, the other by the aid of heat. The oil is much clearer when prepared by the former than by the latter process, and is then called cold-drawn. Its natural property of drying and hardening, when spread as a thin coating upon the surface of wood, iron, or stone work, renders it an invaluable and indispensable aid to the house painter. Its only objectionable quality is its colour, but this may to some extent be discharged by the action of proto-sulphate of iron in combination with sunlight. A solution of two pounds of the salt of iron in two pounds of water is poured into a flask or bottle containing two pounds of linseed oil, and the whole is submitted to the action of sunlight and frequently shaken; the oil becomes limpid and colourless. Another method of purifying linseed oil is to triturate the oil with dry sulphate of lead, in sufficient quantity to form a milky mixture; after exposure to sunlight and frequent agitation, the colouring matter of the oil falls as a sediment with the sulphate of lead, and leaves the oil colourless. Common lead shot, if placed in a bottle with linseed oil, exposed to sunlight, and frequently shaken, will also clear the oil to some extent; but unfortunately linseed oil has a natural tendency to darken in colour in the process of drying and hardening, which no method of purifying it yet discovered will effectually cure, although we have known instances where the opposite effect has resulted and the oil has bleached by exposure. Whether this has arisen from any peculiarity in the local atmosphere of the place where it was used, or from some inherent quality in that particular oil, we cannot now say, but however, from our own experience, such is a fact. To still further increase the drying properties of linseed oil, it is boiled slowly for a certain time with the addition of a small quantity of litharge or of peroxide of manganese. This process darkens the colour of the oil considerably, and renders it unfit for use with light-coloured paints, but makes it of great service in mixing dark colours or those pigments which are in themselves bad driers. The drying qualities of the oil are much improved if only simply boiled, without adding any siccatines, and is of course much clearer without them; the longer it is boiled the thicker it becomes, and in this state it is used for making printing inks, more especially for mixing with the ink and colours used in the patterns for transferring from copper plates on to the biscuit of china or earthenware, the plates being heated on a stove each time an impression is taken, which softens the ink so that it will leave the engraving. The impression soon becomes cold and stiff, and in that state is very tenacious. It is then placed upon the cup, plate, or other vessel to be ornamented and rubbed; the ink adheres so firmly to the dry earthenware that the printing paper may be washed off with a sponge and water, leaving every line behind. It is greatly to be desired that a powerful drying oil could be prepared for use free from the objectionable colouring matter, and yet retain all the other valuable properties of linseed oil. One of our most eminent practical chemists assured us, in a recent conversation on this subject, that there really was no difficulty in preparing a powerful drying oil perfectly colourless. Why it is not done we could not ascertain, but we are quite satisfied, commercially speaking, that it would be a good speculation as well as a great boon to the trade. All painted work will stand best and be least liable to crack or peel if the paint is mixed with pure linseed oil alone, without any siccatine or driers.

Oil or spirits of turpentine is an important vehicle in the mixing of paints, &c., and is extracted from several species of the pine tree. In its crude state it often exudes, like gum, spontaneously from the tree. It is imported in casks from various countries. When highly rectified and pure it is colourless, limpid, volatile, and inflammable. Since the American war, turpentine has been much adulterated by admixture with mineral turps, which is extracted from petroleum or rock oil. During the war turpentine reached extraordinary prices—so high, indeed, as to debar its use except in the best work—and spirit of petroleum was very generally used in its stead for all common work; but the objections to its use are many, one of the principal being its terribly unpleasant smell and its bad drying properties. It appears that the whole of the oil cannot be extracted by any known process, consequently paint mixed with it in conjunction with linseed oil always retains a soft, spongy state, and never seems to get hard, as paint mixed with pure turpentine will do. If turpentine is adulterated with this spurious spirit it may be detected by the smell, and also by dipping a piece of writing paper into the spirit, and then holding the paper before a fire until the spirit is evaporated. If the turpentine is pure it will all evaporate, and the paper may be written upon with pen and ink; but if it is adulterated with petroleum spirit or other oil the oil will remain on the paper, and of course it cannot be written upon.

The principal requisite for making a good varnish is of course a superior quality of gum. Gums, like every other article of commerce, vary in quality, and inferior gums are mixed with the best kinds in order to cheapen the varnish. That this is one fruitful cause of so much inferior varnish being manufactured there can be no doubt. The gums of which the best and most costly of the varnishes used by the house painter are made are the copals, of which there are several kinds—namely, Sierra Leone copal, Benguela copal, red Angola copal, pebble copal, &c.; also gum kowrie or kauri, gum animi, and gum mastic. Of these the Sierra Leone copal is the best and most important. It is procured from Rio, Malacowrie, Pongas, Nunez, and other neighbouring rivers. Its source is probably a tree known to botanists as "Guibourtia Copallifera;" it is a natural exudation from the bark of the tree, and is collected by the natives on the banks of the rivers above named and conveyed to the coast. The exudation consists of soft white tears, which frequently run together into masses. Considerable quantities are washed down, during the rainy season, from the slopes of the mountains on which the trees abound, when it has fallen and become embedded in the soil. The natives subject the copal to a rude washing in lixiviated ashes, whereby the outer crust and its impurities are partly removed, in which state they are shipped to England. Benguela copal is obtained from the interior of Western Africa, by the natives, but there is no certainty as to the trees from which it is acquired. Red Angola copal is found at a distance of eight or nine days' journey from S. Paul de Loande. Gum kauri, the next in importance to the best copal, is the produce of a large coniferous tree, called by botanists "Dammara Australis," and is received in large quantities from our New Zealand colonies. Of late years this gum has become of great importance, the annual consumption being greater than all the other varnish gums together. The varnish made from this gum is often sold for copal, to which it is very inferior, and is often mixed with copal to cheapen that varnish. Gum animi is also used for the finer class of varnishes. Much care is required in the selection and cleansing of these gums before they reach the varnish manufacturer. This is done by various methods—sometimes acids are used for the purpose, but this method has a very injurious effect upon the varnish made from gum thus prepared, causing it to contract and run into small holes, technically called pin-holey. Gum mastic is a resinous substance, which exudes from the tree known to botanists as "Pisticia Lentiscus," and is imported from the Island of Chios. It is a small rounded pigment, of a light yellowish colour, nearly transparent. The varnish made from this gum is principally used for varnishing oil paintings. Shellac, so useful to the house painter in the form of patent knotting (and which patent knotting is made by simply putting shellac and wood naphtha together in a bottle, and occasionally stirring or agitating the two, until the lac is dissolved), is made from stick lac, and only differs from seed lac and white lac in the method of its preparation. It is produced on several species of trees in India, Siam, &c., and results from the puncture of a small insect, the "Coccus Lacca." It is believed that the insect pierces the bark of the young branches of the trees on which they live, and a resinous substance exudes from the wound and incrusts the branch, which constitutes the stick lac of commerce. Whole colonies of these little insects are found imbedded in the lac. The colour of the lac varies in depth in proportion as the colouring matter is more or less removed by washing. This colouring matter is very extensively used by dyers, under the name of lac dye. Shellac resembles the above in composition. The difference in appearance is caused by the washed lac being melted in boiling water, and then poured upon smooth polished stones, so as to cover them with a thin coating. When cool it is removed in flakes. White lac, of which a fine, hard, clear varnish may be made by dissolving a small quantity in spirits of wine, only differs from shellac in having more of the colouring matter extracted.

(*To be continued.*)

A GOOD PAINT.

We would direct the attention of those desirous of trying good paint to the sorts manufactured by "Jay's Metallic Paint Company," of the Woodham Works, near Vauxhall Station. It is very cheap, not only in its first cost, but in the economy of its use, one coating being equal to two of any other paint, according to the inventor. The chief merit of the invention is in the utilisation of the common resin of commerce in combination with oxide of zinc. The resin is first broken up into dust or small pieces, and then dissolved in benzoline or turpentine until the solution acquires the consistency of syrup or treacle, or equal parts of each of the above spirits or hydrocarbons, and any other hydrocarbon that will dry and combine with drying oils can be used instead of turpentine or benzoline. When the solution is complete it is gradually added to the oxide of zinc, which has previously been made into a paste with boiled linseed oil, until the whole mixture acquires the consistency of paint suitable for use. A white paint is thus produced of a most durable and glossy character, capable of resisting heat, moisture, cold, and friction better than any other known point. Other pigments, such as sulphate of barytes, oxide of iron, Brunswick green, red lead, or any other known ingredient, can be added to make any desired colour of paint. One great advantage of its use is its effectual resistance to heat and moisture. It never blisters or cracks, even under the hottest sun or the most inclement weather.

M. Mundler, the eminent art-critic, has died at Paris.

Building Materials, &c.

OSMOTIC ACTION.

IT is a source of wonderment (says the *American Builders' Journal*) to many persons why the well-built stone walls of houses are so damp as to require firring for the plastering of them, no matter what the thickness of these walls may be. Such walls are built of limestone, one peculiarity of which material is that while it absorbs moisture on the outside from the atmosphere, it gives out that which it has absorbed, in compliance with the law of *osmos*, through the action of heat in the interior of the house, and the thickness of the wall does not in the least prevent the intrusion of the damp. The very action of artificial heat upon limestone in the kiln will prove this; for then the moisture it had previously acquired by exposure to the atmosphere is drawn forth, and its acquisitive properties become still more developed; that is, it becomes thirsty, as it were.

The increasing of heat in the rooms of a house, the walls of which are built of limestone, instead of drying thom during rainy weather, actually has the opposite effect, for the *osmos* is superinduced by the attraction of the heat thus created, and the thin surface of fine rain water, precolating through the stone, becomes thicker, and establishes itself in large globules on the plastering of the inside face of the wall; which globules, bursting from accumulation of water, course downward, and keep the whole surface of such wall in a state conducive to ruin of the building, and the ill-health of its inmates.

To remedy this destructive influence of osmotic action on limestone, it is a very common practice to stud the walls and lath on to that studding. But, will it not at once appear evident to a thinking mind that the mischief maker is only hidden, not killed? Is not the influence still at work rotting the studs, and generating the most baleful agency of disease in the space between the plaster and the wall; which noxious humid creation is too surely drawn through the pores of the plaster, by the attractions of osmos?

No, this firring or studding, or boarding (called sheeting) is as unwise an expedient as it is ultimately a useless one. The only certain remedy is to make the outside face of the wall perfectly waterproof; and, even then, although osmotic action be effectually prevented, the other great enemy of limestone, capillary attraction, has to be guarded against, or the damp from the ground will be sure to insinuate itself up into the warm rooms, *via* the heart of the limestone wall, thus circumventing the external waterproofing process. So that it is just as necessary to have a waterproof course between the foundations and the superstructure, or the evil influence of the capillary attraction will prove fully as detrimental as the osmotic action which has so frequently rendered good houses untenantable.

Brick, although as absorbent as limestone, is not as liable to osmos, for the simple reason that one is of a heating nature under the influence of moisture, while the other is cooling, and the absorbent action of the sun quickly draws out again the damp from the brick, while with the limestone the internal heat attracts it through the wall, and the sun's influence only makes it more absorbent and prepares it the more effectually for the next supply of rain.

This is a very interesting subject, and one in which so many are interested that we shall be most happy to hear from our friends who will contribute information towards its development.

SCHEDULE OF CHARGES ADOPTED BY THE AMERICAN INSTITUTE OF ARCHITECTS.

FOR the professional services, including superintendence, 5 per cent. upon the cost of the work; partial service as follows:— For preliminary studies, 1 per cent.; for preliminary studies, general drawings, and specifications, 2½ per cent.; for preliminary studies, general drawings, details, and specifications, 3½ per cent; for stores, 3 per cent. upon the cost, divided in the above ratio; for works that cost less than 5000 dols., or for monumental and decorative work, and designs for furniture, a special rate in excess of the above; for alterations and additions, an additional charge to be made for surveys and measurements. Necessary travelling expenses to be paid by the client. The architect's payments are successively due as his work is completed, in the order of the above classifications. Until an actual estimate is received, the charges are based upon the proposed cost of the works, and the payments are received as instalments of the entire fee, which is based upon the actual cost. Drawings, as instruments of service, are the property of the architect.

BOOKS RECEIVED.

Street's Indian and Colonial Mercantile Directory for 1870, published by Messrs. Street, the well-known advertising agents, has reached us. Their extensive commercial experience has been peculiarly turned to good account in the production of this volume. As an instance of the value of a reliable colonial directory, we may mention that but last week an individual, whose only resemblance to a directory was his shabby and worn appearance, called and modestly proffered for a tangible consideration the names of the chief booksellers in the principal Canadian towns, that we might "open business relations with them," and with our knowledge of the necessity of contracting such business relations, we can readily understand the conductor of a new journal buying the walking directory's knowledge for whatever it was worth In purely mercantile circles the necessity for some reliable guide to commercial intercommunication is imperative, and this guide Messrs. Street will supply.

The various steam routes to the places treated of, with rates of fares and times of transit are enumerated, thus placing concisely before the public the different facilities offered by the several companies, and enabling them easily to arrive at their selection of the most advantageous course for their purpose.

The average time of transit by sailing vessels is also given with, where possible, rates of passage money.

All the London agents to each of the banks are named, so that the merchant is enabled to see to whom to apply, where financial information or assistance is needed in connection with any particular town or city.

Full particulars as to the principal products are given, and the articles in which the trade of each place chiefly consists, so that merchants can at once tell (guided by the Customs tariffs given) with regard to shipments what class of goods would be likely to prove most remunerative.

Lists of the various trades, populations, tabls of local weights and measures, extent of countries, &c., materially enhance the value of the work.

Trades Unions and the Cost of Labour (Longmans, Green, and Co.), is a reprint of a speech delivered on the subject last session by Mr. Thomas Brassey, M.P., with some additional statistics. The speech possesses some value as a compendious statement of facts not generally known in connection with the subject dealt with.

The People's Guide to Life Insurance, by Maurice Grant (Houlston and Sons), is a series of papers on all subjects connected with insurances. It seems fairly and independently to contrast the merits of the different systems now in practice, and will doubtless prove useful alike to insurers and well conducted companies.

Spon's Tables and Memoranda for Engineers, selected and arranged by J. T. Hurst (E. and F. N. Spon), will doubtless find a place in many a waistcoat pocket. It contains nearly a hundred pages of tables and other information hourly needed by engineers, architects, builders and others, and is handy, accurate, and convenient in size.

Trades Unions Defended: A Review of the Evidence laid before the Royal Commission, 1867-8. By William Romaine Callender, Jun., F.S.A. Manchester: Snape and Son, 1870.— Building operations have been so frequently brought to a disastrous stand by "strikes" and "lock-outs," that few architects can well be indifferent to the *ins* and the *outs*, or, let us rather say, the philosophy, of these periodical struggles between masters and men. Fewer still will have sufficiently studied their nature and history to free themselves from the prevailing impression that there is a pretty close affinity between strikes and trades unions. The pamphlet, of which the above is the veritable title, has lately been issued in Manchester from the pen of a gentleman whose trade knowledge and position in that city are at least good enough to re-assure the casual readers who may be tempted to discern in the bold title of Mr. Callender's pamphlet a vindication of strike, in general, and of Sheffield "rattening" in particular. The pamphlet is temperately written, based on the evidence laid before the Royal Commission, with its twenty thousand questions and replies, as also on certain letters in *The Times* and other newspapers by Mr. Edmund Ashworth. Of the connexion (or want of connexion) between strikes and trades unions Mr. Callender advances some very noteworthy assertions. He admits that, in the oft-recurring disputes between masters and men, the trades unions have confessedly an influence maintainable by funds contributed by the workmen who belong to them, but shows (satisfactorily it would seem) that the tendency of th a influence is rather to palliate and prevent than t create or to keep up these disputes. He conten d that strikes have of late years diminished in numbers and intensity, and goes on to say:—

"Strikes have taken place long before unions were formed; their origin cannot be charged to unions, though they have been influenced by the better organisation and better knowledge of late years. The notion that strikes are promoted or accelerated by the influence of the unions is disproved by the very small percentage of funds employed by the principal societies for 'trade' purposes; and the hostile majority of the (Royal) Commission, quoting a large body of evidence, report, 'It does not appear . . . . that the disposition to strike on the part of the workmen is in itself the creation of unionism, or that the frequency of the strikes increases in proportion to the strength of the union.'

"On the contrary," says Mr. Callender, "the tendency to strike is checked by the rule that the workmen in one establishment or district cannot take action without laying their alleged grievances before the executive, or the general body of members. The case is thus carefully considered: in the large majority a policy of conciliation is adopted, while the tendency to accumulate large benefit funds renders the union generally unwilling to proceed to extremities . . . . It is only fair to observe that the whole body of evidence expresses the great desire of the unionists to submit any differences to arbitration."

It would certainly seem, from Mr. Callender's authorities, that the richer are the unions the more rare are the strikes. He instances the frequency of strikes by the tailors' and ironworkers' unions, possessed of but small benefit resources, in comparison with the infrequency of these struggles in the cases of the Society of Amalgamated Engineers or that of the Amalgamated Carpenters, possessed, at the close of 1868, of a balance in hand of nearly £18,000. He adds in a foot-note:—"The Home Secretary, in the debate on the Trades Union Bill, said he had lately been in a part of the country where there were no unions, but where there was a strike that had lasted twenty-one or twenty-two weeks, during which time every species of outrage had been committed, from simple molestation up to murder."

So much for strikes in connection with trades unions. Of unions in the abstract Mr. Callender speaks most approvingly. He opens his pamphlet with some interesting references to ancient English laws, designed, as he says, "to fix a maximum rate of wages and a maximum value of raw and manufactured material;" as also to the expressed opinion of Sir William Erle, that a merchant or mechanic "has a right to full freedom in disposing of his own labour or capital according to his own will," and reminds us that "the legal profession by a strict trades union regulates the number of a solicitor's articled clerks, and the minimum fee of a barrister."

Did space permit, we should be disposed to dwell at some length on this last announcement with especial regard to its application to the case of architects. It makes one's mouth water to think of "the good time coming" when our architects, emulating the exclusiveness of these forensic gentlemen, shall organise a wholesome trades union (with a big sick and superannuation fund by the way), regulating the fees to be paid to, and the pupils to be taken by, its members, and discommoning, *a mensâ et thoro*, every practitioner who shall take bribes from a tradesman, officiate as architect of a building "for nothing," or submit to a competition committee more than say one* agreed sheet of geometrical drawings for a building, to the utter extinction of professional

* There is no edifice in the world whose general design in plan and elevation might not for all competition purposes be adequately shown to scale on a single sheet of drawing paper

quacks and speculators, with their ultra-commercial array of picture-makers, carvers, and gilders.*

Mr. Callender's pamphlet contains some exceedingly interesting statistics, exhibiting the fallacy of our prevalent fears of competition; for example, the case of 4300 English navvies, taken over to work on a French railway, doing the required work cheaper at 5s. per day than the Frenchmen employed on the same work at 2s. 6d. per day. We recommend our readers to procure and read the entire pamphlet, if only for the sake of having their minds disabused of sundry unpleasant reflections created by what the writer considers the generally unfair versions given by the public press of the questions at issue between English masters and their workmen.

Gas Economy. Things Worth Knowing about Gas, &c., by Robert Ferrier, Inspector of Meters for the City of Edinburgh (London: Houlston and Sons. Edinburgh: J. Menzies and Co.), is a handy little book, specially designed for the information of the gas consumer. It contains many useful bits of information about gas burners, meters, price of gas, &c., given in a practical manner by a practical man, and is published at the low price of sixpence.

Arithmetic, Theoretical and Practical, by the Rev. W. H. Girdlestone, M.A., of Christ's College, Cambridge, &c. (London, Oxford and Cambridge: Rivingtons), is a second edition of a work already well known and favourably received. Mr. Girdlestone has devoted attention with success to rendering the *principles* of the science of numbers intelligible by clearly stating the reasons on which they are based, and not contented himself, as do the majority of arithmeticians, with merely giving and working examples of the *rules* that result from those principles. Professor De Morgan has very well summed up the merits of the work in designating it as an "intellectual book." Arithmetical treatises are too often mechanical, and, consequently, to a great extent incomprehensible. Mr. Girdlestone's book is considerably enhanced in value by the addition of an Appendix, containing the arithmetical papers submitted at a number of recent examinations of our public schools.

Building Intelligence.

CHURCHES AND CHAPELS.

Barnsley.—S. Mary's Church, Barnsley, is now in course of restoration. The existing galleries will be removed; the pews will be superseded by new carved oak stalls and benches, by Beanland and Co., of Bradford; the choir stalls and screen have been contracted for by Messrs. Rattee and Kett, of Cambridge; and the internal masonry has been let to Messrs. Robinson and Son, of Barnsley. The east window will be filled with stained glass, and the chancel floor will be paved with Godwin's encaustic tiles. The tower—the only portion of the original church now remaining, the edifice having been rebuilt 50 years ago—is to be thoroughly restored. The tower arch will be opened and the area added to the nave. The ringers' chamber will be raised to its original level, so as to admit of the fine west window being fully opened out. The organ is to be removed to the north side of the choir. The architect is Mr. G. F. Bodley, of London.

Bilton.—The ancient church of S. Helena, Bilton, about nine miles from York, was re-opened on Easter Tuesday. The works which have been executed include the forcing by mechanical means to an upright position the nave arcades and aisle wall, the rebuilding of the bell-gable, and the addition of buttresses to sustain the west wall which was being thrust outwards, the reparation of the ancient roofs of the nave and aisles, the addition of new roofs to the chancel and south chapel, the making good of the walls and windows, and the re-seating of the church. Mr. G. G. Scott was the architect, and Mr. Brumby, of Bishop's-hill, York, the contractor.

Ilkley.—A new Wesleyan chapel, erected at a cost of about £4500 (inclusive of the site) was opened on Wednesday week, at Ilkley. The chapel has been built from the designs of Messrs. Andrews, Son, and Pepper, of Bradford. The style of architecture is the twelfth century Gothic, and the building includes, in addition to the chapel, class rooms and a school-room on the basement, and a minister's house at the rear.

Landkey.—The parish church of Landkey, near Barnstaple, was opened on Wednesday week, after thorough restoration. The old galleries have been removed, and massive oak benches have been substituted for the high pews. The whole of the windows have been renewed, as well as the floors and pavement, and the chancel arch has been entirely rebuilt. The chancel has been arranged for choral services, and a painted reredos representing SS. Paul and Barnabas has been added. The tower has been thrown open. Mr. W. White was the architect, and Messrs. Youings and Hill, of Barnstaple, were the contractors.

Lichfield.—The completion of the Lonsdale Memorial Church, Lichfield, having been effected, the building was re-opened on the 21st inst. The style is Gothic, of the Geometric period. The nave is 70ft. by 28ft., and 60ft. high, with an arcade of four bays, having eight two-light traceried clerestory windows on each side. The aisles are 90ft. by 19ft., and 21ft. to plate, and are finished on the outside with a handsomely moulded line of parapet and hooded buttresses. The lofty roof of the chancel has moulded ribs and purlins, and pierced and moulded cornices (the former springing from columns starting at the string under the clerestory windows, on carved stone corbels). The roofs of the nave and aisles are open timbered—the nave and chancel being covered with Staffordshire tiles, the other roofs with lead. The church is fitted throughout with open benches having moulded and panelled bench ends. The floors are laid with polished Hopton stone. The font is placed at the west end of the north aisle under the window, and is of red Spanish marble. The pulpit is richly worked in Ancaster stone, circular on plan, and has marble columns with carved capitals and cusped arches all round, with carved bosses at the intersection of the hood moulds, and finished with a finely-carved and moulded cornice. The opening of the tower arch and thickening the wall has been admirably done, and has produced a good and handsome effect when seen from the east end of the church. Owing to the very dilapidated condition of the lower stage, which had to be almost entirely rebuilt, a new approach to the belfry has been made from the outside. The turret staircase now projects into the aisle on the south and finishes above the aisle roof with a dwarf spire. The restoration of the tower has been a heavy and expensive work, as owing to its insecure condition a large outlay has been incurred in bracing it together, raising the bells, and restoring its interior. The accommodation is for a thousand persons, and the cost has been from £8000 to £9000. The builders are Messrs. Critchlow and Ward, of Uttoxeter. The carving has been executed by Mr. Ruddock, of London. Mr. James Fowler, F.R.I.B.A., of Louth, was the architect.

Manchester.—At the quarterly meeting of the Manchester committee of the Diocesan Church Building Society, on Thursday week, the following grants were made:—New Churches:—S. John, Accrington, £450; S. Stephen, Kersley, £450; Christ Church, Chadderton, £450. Sites for churches:—York-street, S. Mary's Oldham, £200; Christ Church, S. John, Chadderton, £100. Parsonages:—S. James, Stalmine, £100; S. John Evangelist, Caldervale, £100; S. Edmund, Falinge, £100.

New Brighton.—The foundation stone of a new Wesleyan chapel was laid on Friday last at New Brighton. The chapel is designed to accommodate about 350 people, and there is a school-room attached, which is to hold about 300. The style of architecture is that which prevailed during the first half of the thirteenth century, adapted to the requirements of the present day. The plans of the building were selected in a limited competition, the successful competitor being Mr. Henry H. Vale, Architect, of Liverpool, the contractors for the works being Messrs. J. and T. Mason, of Egremont. The ground plan is in the form of a Greek cross, the arms of the cross forming the transepts to the main body of the building. The materials used in the building are principally local grey bricks, with white stone dressings and ornamental carvings and bands of parti-coloured brickwork.

Northam.—A new congregational chapel at Northam was opened on Good Friday. It is in the Gothic style, from designs by Mr. Gardener, and will seat 300 persons. The material used is local stone, with Bath dressings. Beneath the chapel is a school-room. Messrs. Cooke and Saunders, of Northam, were the builders. The total cost is about £800.

Shiplake.—The ancient parish church of Shiplake, near Reading, was re-opened after restoration on the 21st inst. The whole of the north wall is new, as also the chancel; eleven windows have been filled with stained glass, the small baptismal window being presented by Sir R. Phillimore; the handsome chandeliers were made by Messrs. Hardman, of Birmingham; the pulpit and reredos are of alabaster, carved by M. Earp, of London. The bells have been re-hung by Messrs. Warner, and a new one given by the Vicar added to the peal. G. E. Street, Esq., A.R.A., was the architect, and Messrs. Wheeler, of Reading, the builders.

Thornton-in-Lonsdale.—The ancient parish church of Thornton-in-Lonsdale, dedicated to S. Oswald, which has been rebuilt, was consecrated last Wednesday week by the Bishop of Ripon. The tower, of late but pure Gothic, and three Norman arches of the original church to the west of the north aisle, are retained in the new structure, which has been admirably adapted to the requirements of the site by its architects, Messrs. Paley and Austin, of Lancaster. The church stands picturesquely near the foot of Ingleborough. The exterior is of blue limestone, with freestone dressings, the interior of dressed freestone, which, like the limestone, has been quarried in the neighbourhood.

Ulcomb.—All Saints' Church, Ulcomb, Sussex, was re-opened on Thursday week, after having been restored. The works were commenced in 1864, and have been from time to time since carefully out by the architects, Messrs. Slater and Carpenter, as far as the funds would allow. The works consist of a new roof on the chancel, with panelled and richly moulded ceiling, also new roofs throughout the church. The whitewash has been removed, and all the walls neatly plastered. The windows have been reglazed and some new ones put in. The old wainscot pews have been removed and replaced by open back wainscot seats. A handsome open panelled reading desk has been provided, also a new altar table and rail, and the chancel has been paved with Minton's tiles. The old pulpit has been renovated and replaced. The contractor was Mr. William Bottle, of Harrietsham.

Wivelsfield.—The church of S. John the Baptist, Wivelsfield, in Sussex, was re-opened on Thursday week, after restoration and enlargement. The church is interesting, and follows the type of the Southern Sussex churches. It has a low-proportioned nave and south aisle, chancel, chantry, new north aisle, and a very picturesque shingle-capped towers on the south side. The chancel has been considerably lengthened, with an ascent of seven steps to the altar; the seating is new, and the roofs have been restored. The architects are Messrs. Slater and Carpenter. One of the greatest points of interests in the church is the south chantry, in which the original recessed reredos with its aumbry, has been discovered; the recess is decorated by simple fresco paintings. Much of the Early Pointed work is very rude, but some of the details are very good; and there is a fine old Norman doorway, which is reinserted in the new aisle wall.

BUILDINGS.

Clerkenwell Police-station.—This station, which is situated in the King's-cross-road, is from designs by Mr. T. C. Sorby, late surveyor to the Metropolitan Police. The amount of the contract was about £8000. The building is five stories high, and has accommodation for 96 constables, two inspectors, one superintendent, and one district superintendent. There are eight cells, and they have been fitted up with all the latest improvements. Each of the floors are on an average 11 feet high, and are well lighted and ventilated. The station is built with picked stock bricks, and the front windows and doorways have Portland and Tisbury stone dressings. It has a commanding appearance, and is one of the largest and best-arranged police-stations in the metropolis. The builders are Messrs. Lathey Brothers, of Battersea.

Sandringham.—The Prince of Wales last week inspected the works in progress in connection with the new mansion which has been in the course of construction for the last two years. The old hall has been entirely cleared away, and the new building is being erected by the Messrs. Goggs, of Swaffham, in the Elizabethan style of architecture. The walls are of brick, with Katton stone dressings and facing. The floors are of fireproof construction throughout, formed with rolled iron joists and concrete. The groundwork of the build-

* "If this design is accepted, *a font will be presented* by the author." (A fact.)

ing forms a parallelogram of about 450ft. by 70ft. The new mansion is being erected from the designs and under the superintendence of A. J. Humbert, Esq., of London.

Little Lever.—A new parsonage house is in course of erection at Little Lever, Lancashire. The cost, including outbuildings, &c., will be £1600. Messrs. Cunliffe and Freeman, of Bolton, are the architects.

Melrose District Lunatic Asylum.—Some time ago, the Lunacy Board of Berwick, Roxburgh, and Selkirk shires resolved to erect an asylum for the accommodation of the insane within these counties. A site for the asylum was fixed upon in the vicinity of Melrose, immediately to the north of the Eilden Hills, where a field twenty five acres in extent was purchased from the Duke of Buccleuch at a cost of £1500. The general plan of the asylum buildings forms three sides of an elongated quadrilateral figure, with a centre block between the wings. The general height is two stories. The south-west front is 377½ft. in length, and the south-east and north-west fronts 148ft. 8in., and the centre block between the wings surrounding a small open court is 100ft. by 120ft. The long line of the south-west frontage is relieved by the centre building, which consists of the recreation-hall on the ground and the chapel on the second floor, being thrown forward considerably, and by the infirmaries, which are placed at the right and left angles, projecting 43ft. forward from the general front line. It is further relieved by the style of architecture adopted in the centre division; large windows in keeping with the nature of the apartments (the recreation-hall and chapel) fill up the projection, and this again is surmounted by two towers, 35ft. apart, rising to a height of 70ft. or 34ft. above the general line of the front elevation. On each side of the recreation-hall in the centre, the plan repeats itself—the south side being intended for female patients and the north for males. The south-east and north-west wings consist of a range of rooms for patients and attendants, terminating with another well-lighted day-room, 38ft. by 23ft. The centre or administrative block, 100 by 120ft., within the wings, incloses a small court, and faces to the north-east. The principal entrance is by this block, the entrance-hall being 15ft. by 11ft. From this hall steps lead to the main corridors running right and left to the several divisions of the establishment. There is a considerable slope on the ground on which the asylum is built, entailing rather heavy excavations, but advantage has been taken of this by making a basement story at one end of the building, which can be profitably utilised. The roof is projecting, and the general effect of the plan altogether pleasing, strings of white freestone being carried round wherever the frontage shows. Great pains have been taken in the plans to ensure perfect ventilation, and the high towers rising from the main front have been turned to use as well as ornament. Cast-metal vents from the fires are carried up the towers, and foul-air flues communicating with the principal inhabited apartments are also carried there, and being brought in contact with the heated metal vents, a constant draught will be maintained, and thus all noxious airs will be carried off. Provision has been made for water by two abundant springs on the neighbouring heights being brought into a large cistern on an elevated part of the asylum grounds. A suitable dwelling-house for the accommodation of the doctor is in course of erection near the main building. Considerable progress has been made with the mason-work, upwards of 200 roods of wall being finished, but the building is not expected to be ready for occupation before the spring of 1872. It is intended to accommodate about 150 patients. The total cost will be about £30,000. The architects are Messrs. Brown and Wardrope, Edinburgh.

The New University of London.—The new building for the University of London, which is to be opened by the Queen next month, occupies a portion of the ground between Piccadilly and Burlington-gardens, which measures about 590ft. in length or depth, along the eastern side, and about 567ft. along the western side. The ground belonging to the University measures 256ft. along the Burlington-gardens frontage, and about a foot less for the corresponding line at the back, and it has a uniform depth of 148ft. There is a space of 55ft. between the main building of the Academy and the University, 20ft, of that being the width of a back area of the latter building. In the main front the general line is set back from the street about 17ft., and this adds to the effect. Internally the building, which was designed by Mr. Pennethorne, presents many excellent features. The senate-room is a fine apartment, measuring 45ft. by 38ft. 3in., and is 29ft. 9in. in height. The attached committee-rooms are not so lofty. The enrichments of the walls and ceilings here and elsewhere in the building have been executed by Messrs. G. Jackson and Son, chiefly in Desachy's canvas plaster. The woodwork generally is of wainscot or mahogany. Messrs. Jackson and Shaw were the builders.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

Received.—J. P. and Son—E. L. T.—Minton, Holles and Co.—W. B. and Co.—W. and Co.—S. H. and Co.—S. S. and Co.—W. M. P.—R. C.—R. F.—J. B. H.—W. P.—C. H. B—G. R. R.—F. T.—L. E. X. B.—F. R. J. T.—J. L.—W. I.—J. H.—W. and H.—R. M. R.—J. H. P.—W. J. H.

"A London Brick in Liverpool."—If you send the parcel to the Architectural Museum, have the decency to pay the carriage, and don't do anything you may be ashamed of.

G. F. S.—Write to the secretary of the Central Cottage Improvement Society, Whittington Club, Arundel-street, Strand, W.C.

C. U. P.—Sketch to hand.

L. E. X. B.—Photos. of the drawings were taken, but not being up to the mark, they were not and will not be used. Send address, and drawings will be returned.

J. T. T.—No stamps enclosed.

Correspondence.

DR. ZERFFI'S NEW STYLE OF GRECIAN ARCHITECTURE.

(To the Editor of The Building News.)

Sir,—In the Building News, April 8th, Dr. Zerffi gave a list of buildings in what he is pleased to term the Attic style. In your journal of the 22nd inst. he describes the base, capital, &c., of this supposed style. Now mark, sir, so utterly and entirely ignorant is he of Greek art that he is actually oblivious of the fact that the buildings in his list, so far from having the base he describes, have none whatever, and not one of them the capital he expatiates upon! Yet we are told this is what is delivered at South Kensington Museum. The minor errors in Dr. Zerffi's statements I have not time nor patience to go into. His description of his style will no doubt raise many smiles amongst your classical readers.—I am, &c.

P. E. M.

RECENT IMPROVEMENTS IN BUILDING MATERIALS AND APPLIANCES.

Sir,—In answer to a letter from Mr. Sorby, published in your issue of the 15th, I shall feel obliged if you will kindly allow the insertion of the following remarks. Mr. Sorby very justly concludes his remarks on the Broomhall Tile Company's system of casing concrete by stating, "certainly it made splendid work"—an opinion which I am sure all practical people will share upon inspection of any of the hereafter-mentioned work. I may therefore confine myself to the subject of expense, which Mr. Sorby alludes to as excessive; but from the testimony of other architects who have used the patent blocks on a larger scale, and from a builder whose letter we print (the same having been read at the meeting by Mr. Douglass Mathews), this does not appear to be the case. I feel sure that Mr. Sorby has either made an unintentional error in his calculations, or has been misled.

One thousand of the patent blocks (sufficient to face 250 square feet of building, and such as were supplied, by Mr. Sorby's directions, for the Lea-bridge Metropolitan Police stables and boundary wall) cost 45s. As the company merely supply the blocks, the architect adopting them generally applies to the builder for a contract for the building in the usual manner.

The following letter from Mr. Bishop, a highly respectable builder at Birling, near Maidstone, Kent, who has completed three houses at Mortlake, Surrey, and is now commencing six more, will be reliable information as to cost:—

Birling, March 21st, 1870.

Gentlemen,—In reply to your questions respecting 14in. walls built with your red blocks at a cost of 45s. per 500 double, 1000 when split, and ballast at 3s. per yard, with the usual proportion of ground lime for filling in concrete, my estimate would be £11 10s. per rod, including the red bricks for quoins, arches, &c., &c. Ordinary stock brickwork, the bricks costing 28s. per m., I should value at the same price; but if faced with bricks equal in quality to your red blocks, it would cost 30s. per rod extra. I have no hesitation in saying that I should prefer the blocks and concrete in ordinary houses, as it is undoubtedly much dryer than ordinary brickwork.

Mr. Pope, the architect, is so well pleased with the walls of the Mortlake villas that he gave me the order on Saturday last to build six cottages on the same principle with the red blocks.—I am, Gentlemen, yours truly, John Bishop.

In respect to the blocks not being true, it is a very small percentage that are otherwise, and such are quite as serviceable for inside work. The blocks also separate with scarcely any loss, and in the event of one chipping, short lengths being frequently required, it would be serviceable for such purpose. For a nominal sum the company will separate the blocks, and bear any loss. Trimming the blocks, unless they are required to be tested by a straight-edge, as we are informed was thought necessary at Lea-bridge, has never been heard of, and is, I think, a test to which bricks are not usually submitted. Mr. Alfred Smith (architect to the Army and Navy Club) authorises us to refer to him at 19, Buckingham-street, Strand, to endorse the above statements, he having employed both red and white patent blocks for extensive] buildings situated near S. Matthias' Church, Richmond-hill.

Mr. Walford, of 21, Northumberland-street, Strand, also permits us to refer to him, and to state that during the erection of the buildings at Hersham Lodge, Walton-on-Thames, walls were cut through and alterations made without the slightest difficulty.

The company's price for patent damp-proof and ventilating course is 6d. per foot super. delivered in London, or 4d. at Tamworth. For the penny in excess of the price allowed by Mr. Sorby for slate and cement course, good and regular ventilation is secured for the ground timbers, to say nothing of the additional height obtained by the thickness of the course.

The patent roofing tiles alluded to by Mr. Sorby are some used three years ago, previous to the introduction of nailing *every* tile. The company are quite willing to give a written guarantee to any architect, and beg to refer them to such works as the New College at Dulwich, or houses roofed with the tiles for Mr. Douglass Mathews at Bromley, Kent. Numerous other buildings in various parts of the country can be named upon application. If repair is necessary, it is more easily done than with any other roofing material. Details can be better explained at the company's premises, Cox's Wharf, Upper Ground-street, Blackfriars.—I am, Sir, &c.,

Charles Lucena, Managing Director.
Broomhall Tile and Brick Company, Limited,
Cox's Wharf, Upper Ground-street.
April 27, 1870.

THE VENTILATION OF DWELLINGS.

Sir,—We have heard lately a great deal about "fever dens," but it appears to me that the proper method is not taken to ventilate them. I have had notice served where fever has been in the houses to have all the sashes made to open at top; they are not hung at present—and many are not in small and old houses at this time. This is all very well if you could get the tenants to keep them open, but the poor people generally are so averse to fresh air, that they frequently paste and paper up the sashes in cold weather. I would recommend that an iron air brick or ventilator be let into the chimney breast, close to the ceiling, the cutting made upwards at a sharp angle into the flue. This would carry off the foul air, which is very bad where eating and sleeping is carried on in the same room The ventilator should be always open. If there was one in every poor person's living and sleeping room, I think we should not have so many cases of fever, bred by the foul air breathed over again. Care should be taken to prevent the tenants from stopping or papering up the ventilator. J. D.

DRURY LANE THEATRE.

Sir,—In your last impression my name appears to have been very unnecessarily dragged into an article on the fitting-up of Drury Lane Theatre for the opera, as it would appear, to give colour to an assertion which the writer knows as well as I do has no foundation in fact—viz., that the works which I directed for Mr. Chatterton last Christmas were done "by the scene-painters of the Gaiety Theatre." All the work was done by Mr. J. Robinson, a well-known and most efficient contractor, in the best possible way, and to my entire satisfaction.—I am, Sir, &c.,

C. J. Phipps.

THE BEDFORD CANAL EXPERIMENT (SIX MILES).

Sir,—As a correspondent has asked for some particulars respecting the above, I, having read all the correspondence, and tested the experiment on paper, will, with your permission, reply. In the first place, I may state that the flat theorists cannot seem to comprehend the laws of gravitation and the rule of tangents, together with the laws of perspective. The first experiment consisted of sighting from end to end with a 5-foot telescope; the line of sight forming a tangent with its centre in contact (to a sphere), the centre signal appeared approximately over 5ft. above it, thus proving that the three points were not in a straight line, but that by adding refraction, making 6ft., a curve with the radius of the earth would intersect the three points. The diagram of this experiment was signed under protest by the globular opposer's referee, for what reason would appear strange to us who know the rule of three "boring sticks." The next experiment consisted of sighting from end to end with a Troughton's level, the line of sight (in this case) forming a tangent with its point of contact at the first station. The centre signal (if reversed) appeared below the cross hair, and the end signal below the centre one; thus proving that they were not in a straight line, but dipping from the tangent. This experiment was reversed at each end, with the same result. But the globular opponent's referee argues that as the two signals and cross hair appeared equidistant from each other in the telescope, for that reason they must be in a straight line from end to end, and that the apparent dipping must be the result of perspective diminution; but those of us who know anything of the laws of perspective could inform him that all objects standing upon a straight plane with their tops the same height as the eye must line with and cut each other, and that the bases only will vanish towards a horizontal line passing through the eye. If the signals and cross hairs were equidistant it would prove curvature, to wit, if the end signal dipped (less refraction) 20½ft., the centre one would dip 7ft. 8in. By making a side view on paper it will be found to be a curve (horizontal scale, say 1in. to a mile vertical, ⅛in. to a foot).

The problem may also be tested perspectively by measuring the dips on the vertical picture line. But as this curve does not give the theoretical value—viz., 5·14ft. in 3 miles and 20·57ft. in six miles (refraction deducted), as partly proved in first experiment, we have good reasons for doubting this equidistance. For the theoretical curvature the centre and end signals should appear twice as far apart as the centre signal and cross hair—as may be tried by a perspective problem. In the diagrams of Mr. Wallace's referee they are shown about in that proportion, but as all the diagrams seem to have been rough sketches, they must be taken approximately, otherwise a micrometer should have been used. A curvature has been proved, therefore, on Mr. Wallace's side, although doubted by the opposite side. We may also consider it (in the absence of minute measurement) as the theoretical value, viz.:—

sighting 5·14
+ refraction ·86 = 6ft. in 3 miles.

sighting 20·57
+ refraction 3·43 = 24ft. in 6 miles.

I am, Sir, yours, &c., E. Y. Poole.
Grovetown, Weston-Super-Mare.

CONCRETE BUILDING.

Sir,—From the opening remarks in Mr. May's letter on the above subject, which appeared in your journal of the 8th inst., I was led to believe that he intended to afford some information respecting two systems of concrete building, viz., the "block" system and the "apparatus" system, but was disappointed to find that, without giving any practical reason, the "block" system was praised by him and the "apparatus" system condemned, the letter concluding with promises, "with your permission," of explanations at a future time.

Now, Sir, although I have had some experience in concrete building, I am always anxious to "live and learn," and reliable information on any system that would "ensure durability and economy" in cottage construction is worthy of acceptation, the cheap dwelling question being the question of the day.

If I am not encroaching too much on your space I will briefly describe the two systems, and endeavour to point out the advantages or disadvantages of each.

Mr. May, in his block system, casts his blocks 2½in. thick, the "stretcher" blocks about 12in. long by 9in. high, and the "header" the same height by the required thickness of the walls; thus the difference between the length of the "header" block and the thickness of the two "stretcher" blocks results in a cavity up the middle of the wall, special rebated "header" blocks being cast for all door and window openings, the whole requiring skilled labour in erection, as in brickwork. So much for construction, now as to cost. I think I can show, presuming even that gravel can be obtained on the site, that the cement mixed 1 to 9, the labour of digging the gravel and the labour of mixing and of casting in the moulds, equals, and in many cases would even exceed, the cost of bricks, thus:—

	s.	d.
Gravel per yard	1	0
Two bushels of cement at 2s.	4	0
Labour of mixing and carting	3	0
	8	0

per yard cube of material, but as a deduction must be made of ¼th for shrinkage, we have ¾ of a yard of material, equal in bulk to 288 bricks for 8s., or equal to 27s. 9d. per thousand, and as skilled labour and mortar are required in laying the blocks, costing at least 6s. per cube yard, the total cost is £9 per rod, measured as brickwork, the only saving effected being in cartage and in building the walls hollow. In the case of a workman building a cottage for himself there may be economy in the "block" system, as he could cast his blocks in his spare time on winter evenings, and lay them in the light summer evenings, and Mr. May being a plasterer, and casting his blocks himself, this is no doubt the light in which he looks at the question when speaking of economy.

Let us now consider the "apparatus" system. Of course for this certain machinery is required, but if once obtained it will soon repay itself. An addition of 1s. per cube yard to the cost of the work will amply cover principal and interest expended in procuring it. By this process no skilled labour is required, no casting of blocks, and no laying of them afterwards; the concrete is mixed up and thrown at once into its place in the walls, and if we compare the cost of this with the "block" system, taking materials at the same price, we shall find the result decidedly in its favour. Thus:—

	£	s.	d.
9 yards gravel at 1s	0	9	0
18 bushels cement at 2s. ...	1	16	0
4 yards clinker packing at 2s.	0	8	0
Labour on 13 yards at 2s. 3d.	1	9	3
Use of apparatus at 1s.	0	13	0
	4	15	3

allowing ¼th for shrinkage on the gravel, as by the other system we have 11¼ yards cube of walling complete for £4 15s. 3d., equal to 8s. 2d. per cube yard, or £4 11s. 10d. per rod, or but little over half the cost of the "block" system.

One word as to coating the exterior surfaces of the walls. I maintain that there is no material to which such surfaces adhere more closely than to concrete. There are bad plasterers and bad workmen in every trade, but I never yet saw a Portland cement surface on a concrete house either peel or drop off, and this is the only material a practical man would ever dream of using. As for the additional cost of coating walls erected with apparatus, I can only say that those erected with blocks require a thick wash of neat cement to make them at all presentable and the thin face on a wall erected with apparatus being mixed 3 of sand to 1 of cement, costs no more for material, and but a trifle more for labour, and in appearance far surpasses that of the blocks.—I am, Sir, &c., W. F. Hooper.
3, Park Prospect, Queen-street, Westminster,
April 25, 1870.

It is not a little remarkable, says the *Guardian*, that in one daily paper last week there were advertised the residences of three ex-Premiers to be let or sold. Brockett Hall, Hertfordshire, the favourite home of Lord Melbourne, and after him of Lord Palmerston, is to be let; and Rodborough Manor, Lord Russell's seat near Stroud—which borough he once represented—is to be sold by auction shortly.

Intercommunication.

QUESTIONS.

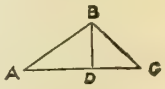
[1837.]—HALIFAX BUILDING SOCIETY COMPETITION.—Can any of your readers inform me when the competition for the Halifax Permanent Benefit Building Society will be decided? The drawings were sent in on the 8th of February. What can cause such delay?—A Competitor.

[1838.]—FALLING OUT OF STOPPING.—Will any of the readers of The Building News have the goodness to give the writer the benefit of their experience as to the possibility of avoiding the loosening and falling out of the stopping round door and window frames in new buildings? He has been subjected to this annoyance in almost every building he has erected, and is at a loss to know how to prevent the recurrence of the evil. The usual phrase "bed and point in lime and hair mortar all door and window frames" certainly does not insure the architect against this vexation.—Architect.

[1839.]—WHITE GAULT FACINGS.—What is the best way to clean off vegetation and dirt from a brick front which has been exposed throughout the winter? The vegetation more especially is difficult to remove. The bricks, when clean, would be under shelter.—E. H. H.

[1840.]—ASPHALTE VARNISH AS REMEDY FOR DAMP WALLS.—As I am anxious to make the experiment of coating Portland cement seams of pointed rubble masonry with the above, I should feel obliged if any of your readers would inform me through the medium of your journal whether they know of any precedent where it did answer the purpose effectually and continue to do so; if not, is it likely to answer the purpose?—Subscriber.

[1841.]—PROBLEM.—The sides of the triangle A B C are A C = 340, A B = 300, and B C = 160. Find the length of B D, A D, and D C; also the cosines of each of its angles.—A Learner.

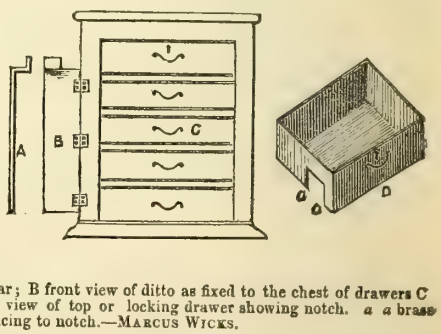


[1842.]—VERMIN.—I have to build a kitchen against an old stable, the division wall being a new 9″ wall of brick. Can any of the readers of The Building News advise me as to the best means of keeping out from the kitchen such vermin as rats, cockroaches, beetles, &c.—A. Y. E.

REPLIES.

[1805.]—PLUMBER'S WORK, &c.—The observations made by "G. L." on my answers to questions on the above subject are quite correct, and I am obliged to him for having made them.—W. W.

[1827.]—LOCKING DRAWERS.—"H. R. E." can lock his nest of drawers by one operation by the following appliance:—A straight bar of flat iron ½″ thick, with a small bend at the top, as shown in sketch, is screwed on to the side of the nest of drawers. A small notch is cut in the locking drawer, in which the bar catches, and folding over the ends of the other drawers fastens them—see sketch. A is an end view of the



bar; B front view of ditto as fixed to the chest of drawers C D view of top or locking drawer showing notch. *a a* brass facing to notch.—Marcus Wicks.

[1829.]—ENGINEERS' EXAMINATION.—From the question put by "Edinburgh," he does not seem to be aware that one of the regulations of the Secretary of State with reference to the appointments in the Indian Public Works Department is that all candidates must have passed at least one year in the office of an engineer in actual practice. No amount of time passed at a college or school of engineering will compensate for this practical probation. It is indispensable.—A Candidate.

[1830.]—DEFLECTION OF BEAM.—The deflection of a girder loaded at the centre may be calculated by the formula

$$D = \frac{W \times L^3}{4\,E\,(6a + a^1)\,d^2}.$$

In this formula D equals the deflection at the centre, W equals the weight, L the length of the girder, E the co-efficient of elasticity, *a* the area of either the top or bottom flange, supposing them to be equal to one another; a^1 the area of the web, and *d* the depth. The value for E may be taken equal to 24,000,000lb. By making W equal its own weight, which will thus be uniformly distributed, the deflection may be calculated by the formula

$$D = \frac{5\,W \times L^3}{32\,E\,(6a + a^1)\,d^2},$$

In which the value for E is the same as in the other equation, and the letters have also the same signification.—A. S. Q.

[1833.]—THE EARTH'S SPHERICITY.—By the usual

ormula for the correction for the curvature of the earth, the height would be equal to

$$\frac{2 \times D^2}{3} = \frac{2 \times 3 \times 3}{\cdot 3} = 6\text{ft.}$$

—A. S. Q.

[1836.]—GOVERNMENT HOUSE, OTTAWA, CANADA.—Mr. Thomas Fuller, an Englishman, of whose design for the Capitol at Albany, New York (now building under his and his partner's, Mr. Lavers' immediate superintendence) you published an excellent lithograph with your paper of the 7th Jan., was also the previously successful competitor and appointed architect for the Government at Ottawa.—A Relative.

WATER SUPPLY AND SANITARY MATTERS.

Sanitary State of Hampton Court.—Dr. Barton has not spoken a minute too soon in calling attention to the drainage and water supply of Hampton Court village. On the north side of the green, from the gates of Hampton House to the gates of Bushy-park on the Kingston-road, a distance of about 350 yards, there are, it seems, twenty-four houses bordering on the park. From these the sewage drains into no fewer than forty-six cesspools, of which twenty-five are in the park, immediately under the windows, while the rest are in the little gardens in front. Most of the houses have more than one of these cesspools, which being sunk in gravel, and so constructed as to let the sewage infiltrate the soil, require to be emptied less frequently. For almost every cesspool these houses have a well placed between the cesspool and the Thames, so that the impregnation of the water-supply with the sewage is a result as certain as such an ingenious arrangement can render it. On testing samples of the water from these wells with permanganate of potash, Dr. Barton found them loaded with organic matter, much of which he rightly infers to be animal. The town of Hampton has been in a similar non-sanitary condition ever since its sewage has been denied an exit into the Thames. In a few weeks that palatial vicinage, the health resort of many a summer resident and the scene of many a holiday junketing, will be crowded with multitudes little conscious of the fever preserve into which they have ventured. The *Lancet* echoes Dr. Barton's demand for some authority to compel the parish of Hampton and the local board of Hampton Wick to find a remedy for this sanitary evil without delay.

Bolton.—A special meeting of the Parliamentary Committee of the Bolton Corporation was held on Saturday morning last, for the purpose of considering a communication which had been received from the Home Office in reference to the provisional order applied for by the Corporation for the construction of sewage outfall works at Burnden, and other works. This communication from the Home Office was evoked by a memorial which had been presented to the Secretary of State by a number of owners on the stream, who expressed their intention of opposing any works which would have a tendency to pollute the water. Mr. Taylor, on behalf of the Home Secretary, pointed out that the Rivers Pollution Commission had reported in favour of irrigation, and suggested that some arrangement should be come to with the memorialists. As in the event of opposition the Home Secretary must refuse to grant the provisional order, it was decided to seek an interview as early as possible with the memorialists and Mr. Bruce.

Decrease of Scarlet Fever.—Dr. Whitmore, of Marylebone, in his last monthly report says:—"It is very satisfactory to observe that the mortality from scarlet fever has declined during the past month to something considerably below the average, and that the number of new cases of sickness from the same disease returned to me from 11 charitable institutions in the parish amounted to only 51. We may now indulge in a confident hope that this fatal disease, which has prevailed throughout the whole of London for the last seven months, has ceased to exist as an epidemic, and assumed its ordinary sporadic character."

A Fever Stricken Town.—During the past week Dr. Buchanan, a Government inspector sent down by the Medical Department of the Privy Council, has been engaged in making a sanitary inspection of the town of Whitehaven. Attention has been directed to the high rate of mortality in the town, and inquiry showed that during the last four months there had been, out of a population of 19,000 people, between 360 and 370 cases of typhus fever, and one patient out of every six had died. The medical officer of the local Board of Trustees, on being called upon to report on this sad state of affairs, attributed the frequent occurrence of fever at Whitehaven to overcrowding and defective drainage. Out of 4538 inhabited houses, 2500 had no drainage except the surface. He stated that he had urged upon the board the absolute necessity of enforcing a proper and efficient system of household drainage; some of his suggestions had been adopted, and some had not. On Tuesday Dr. Buchanan arrived at Whitehaven and commenced a personal inspection of the town, which occupied him three or four days. The effect produced upon his mind by this inspection was that, after he had been in the town a few hours, he telegraphed to the Privy Council that Whitehaven, infected and overcrowded, was not a fit place for the Cumberland militia to ssemble in for their annual periodical training. Adjutant Captain Morris Fawcett has accordingly, by order of the Secretary for War, issued a notice countermanding the former summons, and announcing that the Cumberland militia are not to assemble this year. They will, however, receive their usual bounty.

A large Death-Rate and its Cause.—Accounts as to the sanitary condition of some parts of Monmouthshire are really alarming. Defective drainage, the proximity of pigstyes to dwelling-houses, and other unwholesome causes are doing for the inhabitants just what may be expected. Pontnewydd and Cwmbran, villages between Newport and Pontypool, have suffered frightfully from typhoid fever. Blaenafor, a town numbering some 8000 inhabitants, is in a deplorable state, and measles are carrying off the children at the rate of six or seven a day. Such was the number of deaths there last week that the death-rate rose to 163 per 1000, instead of the usual proportion of about 22 per 1000. To cope with this awful mortality there are but three medical men.

The Pollution of the Thames.—Mr. J. J. Mechi asks whether any reasonable person can believe that the available annual produce of 20,000 acres of cultivated land (which is the daily consumption of the population of London) can be, after digestion, poured into the Thames without creating not only a liquid nuisance but a large solid deposit of disgusting mud, especially when this is supplemented by vast quantities of refuse from other sources? He hopes that the Thames Conservancy will compel the Metropolitan Board of Works to apply this vast mass of wealth to the production of food for the people.

Our Office Table.

Building and Repairing Churches and Chapels.—The Incorporated Society for promoting the Enlargement, Building, and Repairing of Churches and Chapels held its usual monthly meeting on Monday at the Society's house, 7, Whitehall, the Rev. Canon Nepean in the chair. Grants of money were made in aid of the following objects, viz.: Building new churches at Battersea, S. Philip, Surrey; Everton, S. Peter, near Liverpool; High Hurst Wood, in the parish of Buxted, near Uckfield, Sussex; and Newington, All Souls' (Grosvenor Park), Surrey. Rebuilding the church at Llanfihangel Abergwessin, near Knighton, Brecon. Enlarging or otherwise increasing the accommodation in the churches at Barnsley, Yorks; Chelsham, near Croydon, Surrey; Colchester, S. James's; Henfield, near Hurstpierpoint, Sussex; Llanfihangel-y-Croydden, near Aberystwith; Meonstoke, near Bishop's Waltham; and S. Dominick, near Callington, Cornwall. Grants were also made from the school-church and mission house fund towards building, &c., school-churches or mission houses at Wandsworth-common, Surrey; High Wych, S. James, near Bishop Stortford, Essex; Meopham, Kent; Froncyssyllte, in the parish of Llangollen; Denbigh; High Town, in the parish of Luton, Beds; Poplar, S. Paul (Isle of Dogs); and Haslington, Cheshire. These cases having been selected as the most urgent from a number of applications, the committee were compelled very reluctantly to refuse assistance to seven others, which, but for want of funds, they would most gladly have aided, and again, therefore, contributions are earnestly solicited, in order that they may be relieved at the next meeting.

Gloucester School of Art.—Earl Ducie, in writing to Mr. Gambier Parry, offering to give a donation towards furnishing a school of art and museum to Gloucester, adds:—"I must, however, make one stipulation, viz,, that I shall not be bound to subscribe unless a reasonable amount of support is given by (what I know no other name for) the middle classes—the tradesmen and others in Gloucester. The subscriptions, as recorded in the circular, are at present large sums from a limited number of donors. Such an institution as that which you contemplate should be supported according to their means by every class of persons, and should not be a semi-eleemosynary affair, provided by the few rich for the numerous moderately well-to-do. I am quite content to leave it in your hands to decide when adequate general support has been secured, and on your demanding it, when the assurance that all are taking a fair share of the burthen, the money shall be sent to you."

Ornamental Wrought Ironwork.—Messrs. Brawn and Downing, of Birmingham, have just executed a pair of gates for Earl Manvers, intended for the entrance of the courtyard at Thoresby Park, his lordship's seat in Nottinghamshire, where a considerable quantity of wrought-iron park railing of similar character is now being erected. The gates measure 21ft. in width from the outside of the piers, and are between 17ft. and 18ft. high. The gates themselves are each 16ft. wide, the piers being 2ft. 6in. in width. The piers are of wrought iron, the work being solid and durable, and presenting a better appearance than stonework or other material. The piers will be surmounted with large lamps in wrought iron, of similar design. The gates will be run on quadrants, and thus be capable of being opened and closed with the greatest ease. The framework is heavy and substantial, which gives (in contrast) the ornamental ironwork itself a light and graceful appearance. The style is that of the Renaissance period, a style which, in ornamental metalwork at all events, is said to be rapidly superseding the Gothic. The flowers and foliage, spike and stem, leaf and blossom, are beautifully wrought—all hand-hammered, forged, and welded, without screw or rivet throughout.

Art Union of London.—The annual meeting of members was held on Tuesday, in the Adelphi Theatre, Lord Houghton, the president, occupying the chair. Mr. Lewis Pocock, hon. secretary, read the thirty-fourth annual report, which announced that the engraving for the ensuing year will be "Light and Darkness," from a picture by Mr. George Smith, representing a blind girl as a Scripture reader. The Hon. Alfred Bagot and the Rev. Dr. Mortimer had been elected to fill the vacancies in the Council. The subscriptions of the year had amounted to £10,710 10s. 6d., and the sum available for the purchase of works of art would be thus allotted, viz.—22 at £10 each, 20 at £15, 10 at £20, 12 at £25, 10 at £30, 8 at £35, 6 at £40, 6 at £45, 4 at £50, 2 at £60, 2 at £75, 2 at £100, 1 at £150, and 1 at £200. There would also be distributed 20 bronzes of the Nelson column, and 200 chromo-lithographs, by Messrs. Kell, of Birket Foster's "Bellagio—Como." Including the Parian busts there would be 476 prizes, in addition to the work given to every member. The reserve fund now amounts to £15,466 12s. 9d. Lord Houghton, in moving the adoption of the report, observed that it touched upon every topic connected with art that had engaged attention since they last met. It very properly attached great importance to the character of the works prizeholders might select, for considering the enormous circulation of their prints, it was necessary, for the sake of elevating the public taste and judgment, that the subject chosen should be equally high and noble in character as a work of art. Two principles ought to guide the selections—one, that the picture should be a good work of art in itself, and the other that the subject should be interesting to the community at large, but it was not always possible to obtain this combination. The noble lord concluded with a feeling tribute to the memory of Mr. D. Maclise, R.A., whose death was announced in the papers that day. He recalled to mind that a prizeholder had selected this artist's work, "The Sleeping Beauty," which realised for the artist only £300, but two years afterwards was sold for £1200, and probably now would fetch double that price. The same artist's two great paintings, the "Battle of Waterloo" and the "Battle of Trafalgar," were in the hands of the engraver for the purposes of this society; and he was sure the copies would be highly valued by the members.

Flats for the Middle Classes in Queen Victoria-street.—Mr. J. Douglass Mathews, in furtherance of the views expressed by another correspondent of the *City Press*, refers that journal to a letter of his published in The Building News for Dec. 24th last, in which he took occasion to suggest the desirability of constructing dwellings for the middle classes on the "flat" system in this street, the ground-floor and one or two basements being used for shops or warehouses. The rent of the ground will be too high to admit of its being occupied in the general way by warehouses, and at the present time the City is overstocked with offices. Mr. Mathews feels sure there are many men with small families, and also bachelors, who would gladly give up their houses in the suburbs for suitable accommodation in the City, as it is agreed on all hands that there is no healthier place. By this means one or two hours a day, which are now consumed in travelling, would be saved, as well as the expense of railway and cab fares, &c., and the advantage of a central position secured. He fears we shall not be able to look forward to house gardening here at present, but the near proximity to the Temple-gardens and the Embankment, and the openness of the street itself, will afford sufficient fresh air and amusement for the residents.

Chips.

The Farnworth Local Board is in treaty for a site for a new market. The price asked is £3000.

Fleet-street is (not before it wanted it) being repaved.

We are informed the competition drawings for laying out land in the Old Kent-road, are now on view daily at the Vestry Hall, Camberwell, from 10 to 5.

The Fellows of the Society of Antiquaries, we understand, are likely to alter their statutes, so as to meet only once a fortnight, instead of weekly as hitherto.

Marlborough College, lately severely visited with fever, is, we are informed, being ventilated by Mr. Potts of Handsworth, near Birmingham, on his new system. As much of the work as can be accomplished during the vacation, is being proceeded with.

The erection of the Triquetri marbles upon the walls of the Albert Memorial Chapel, Windsor Castle, is progressing. All round the chapel just below the tableaux costly seats of richly coloured marbles, and of elegant design, will be placed as resting places, while the floor will be repaved with marble. It is believed that when finished this memorial chapel will occasionally be opened for public inspection.

Timber Trade Review.

THE TIMBER MERCHANTS AND THE NEW BUILDING ACT.

A MEETING will be held on Friday (to-day) the 29th inst., at 2 o'clock, at the Surrey Commercial Dock Company's Offices, 106, Fenchurch-street, of timber merchants, builders, cabinetmakers, and others, whose interests would be affected by the passing of the Bill now before Parliament, entitled "A Bill to Consolidate and Amend the Building Acts relating to the Metropalis," the 111th clause of which runs as follows:—

111. "It shall not be lawful for any person to erect, rebuild, place or replace, a building built of wood for the purpose of floor-cloth manufacture, or a pile or store of cut wood or timber on the ground or on the top of a building or elsewhere, nearer to a street than the buildings forming the general line of building therein, or nearer to a building in different occupation than twenty-five feet, unless in every case there is a proper wall or fence or party wall, or party fence wall, as the case requires, to separate such wooden building or wood, or timber, throughout its whole height, from the street, and from every adjoining or neighbouring building.

"If any person acts in any manner in contravention of this section, he shall for every such offence be liable, on summary conviction before a magistrate, to a penalty not exceeding fifty pounds, and in case of a continuing offence to a further penalty not exceeding twenty pounds for every day during which such offence continues after the day on which the first penalty is incurred."

CONSUMPTION OF TIMBER IN THE UNITED STATES.

One hundred and fifty thousand acres of the best timber is cut every year to supply the demand for railway sleepers alone.

For railroad buildings, repairs, and cars the annual expenditure in wood is 38,000,000dols. In a single year the locomotives consume 56,000,000dols.' worth of wood. The number of artisans in wood is set down at 400,000, and the wood industry of the country represents some 500,000,000 per annum.

The sale of timber, deals, &c., by public auction at the Baltic Sale Room, Threadneedle-street, took place on Wednesday, April 13. Auctioneers, Messrs. Churchill and Sim.

This was a sale of about 275,000 deals, &c., of all sorts; 180,000 flooring boards,; 160 fathoms lathwood; 970 wainscot logs, 980 loads timber, all at the Surrey Commercial Docks, and a large quantity of fancy woods lying at the West India Docks.

There was a fair attendance, and better prices were realised than was generally expected. No Baltic timber was offered.

	s. d.		s. d.
BALTIC FIR, per cubic load, none.			
Swedish	44 0	to	53 0
Quebec Red Pine	72 6		
Yellow Pine	70 0		
Riga crown, English Logs, per cubic foot	6 0		
Dutch crown	4 6		
Brack crown	3 3		

	£ s.		£ s.
Archangel yellow, per standard of 120. 12ft. 1½ × 11	12 0	to	12 5
Wyburg yellow	9 5		
Jacobstadt do.	8 0	„	8 15
White	6 10		
Skelleftea do.	7 0		
Onega, 2nd yellow	9 10		
3rd do.	8 15		
Petersburg, 2nd white	7 15		
Gefle, 1st and 2nd yellow	8 10	„	11 0
3rd do.	8 15	„	9 10
Holmsund, &c., 1st and 2nd yellow	8 15	„	10 10
3rd do.	7 15	„	9 0
1st and 2nd white	7 10	„	7 15
NORWAY YELLOW BATTEN	5 10	„	7 10
2½ × 7 Yellow battens –			
Gefle, 1st and 2nd yellow	8 15	„	9 0
Gothenburg, 1st and 2nd do.	9 0		
Bjomeborg	7 0		
Sundswall	8 5		
Gothenburg, 3rd do.	7 15		
Sundswall	6 15		
Norway white	6 5	„	7 10

FLOORING BOARDS, at the customary square, viz.:—

9in.	8in.	7½in.	7in.	6½in.	6in.	5½in.	5in.	4½in.	4in.
Ft 140	160	170	180	185	190	200	210	220	230 240

	s. d.		s. d.
First yellow 1¼ × 7	13 9	to	14 9
„ 1 × 7	10 3	„	11 0
„ ⅞ × 7	8 6	„	9 0
„ ¾ × 7	7 6	„	8 0
„ ⅞ × 6½	7 6	„	8 6
„ 1¼ × 6½	12 6	„	13 0
„ 1 × 6½	9 0	„	9 6
„ ¾ × 6½	6 6	„	7 0
Second yellow 1 × 7	8 0	„	8 6
„ ⅞ × 7	7 0		
„ 1 × 6½	8 0	„	8 6
„ ⅞ × 6½	7 0	„	7 6
First white 1 × 7	8 6		
„ ⅞ × 7	7 0		
„ ¾ × 7	6 3		
„ 1 × 6½	8 6		
Second white 1 × 7	8 0		
„ 1 × 6½	7 6		

	£ s. d.		£ s. d.
LATHWOOD, per cubic fathom			
Petersburg	6 0 0	to	6 10 0
Riga	5 0 0		
Swedish	4 2 6	„	5 2 6
Per standard of 120. 12ft. 1½ × 11—			
Quebec first spruce, 12ft.	11 5 0		
„ „ 10ft.	9 10 0		
„ first bright pine, 12ft.	17 0 0	„	19 10 0
„ „ 8ft.	15 0 0		
„ „ 2in.	16 5 0		
„ second, 12ft.	13 0 0		
„ „ 10ft.	12 0 0		
„ „ do. 3 × 7	10 0 0		
Quebec first floated, 12ft.	15 15 0	„	17 0 0
„ third „	8 15 0	„	9 10 0
„ first spruce	7 15 0	„	8 5 0
Rimouski first spruce	8 17 6	„	9 0 0

Quebec white ash, 2½d. to 3½d., super.
„ white oak, 2½d. to 2½d.
„ cherry tree, 3d.
„ button wood, 2½d.

BAHIA ROSEWOOD, £18 per ton.

BAHAMA SATIN WOOD, £7.
Do. furniture wood, £3.
Do. lignum vitæ, £4.

CUBA MAHOGANY.—Prices differ so much according to quality that the best way is to give the price each lot fetched. Those who have seen the timber can then judge for themselves.

Lot 1, 5¾d.; 2, 5¾d.; 3, 5¾d.; 4, 6d.; 5, 6d.; 6, 6¼d.; 7, 6¾d.; 8, 7d.; 9, 9¼d.; 10, 9d.; 11, 8d.; 12, 8d.; 13, 6d.; 14, 7¾d.; 15, 6¾d.; 16, 7¾d.; 17, 6d.; 18, 6¾d.; 19, 6¾d.; 20, 6¾d.; 21, 6¾d.; 22, 7d.; 23, 6¼d.; 24, 7¼d.; 25, 6¼d.; 26, 7¾d.; 27, 1s.; 28, 1s. 2d.; 29, 1s. 9¼d.; 30, 9¾d.; 31, 9¾d.; 32, 8d.; 33, 10d.; 34, 1s. 1¼d.; 35, 8¾d.; 36, 7¾d.; 37, 8¾d.; 38, 8¾d.; 39, 10d.; 40, 6¼d.; 41, 6¾d.; 42, 1s. 10d.; 43, 1s. 6d.; 44, 3s. 7d.; 45, 1s. 2d.; 46, 2s. 10d.; 47, 10d.; 48, 2s. 8d.; 49, 2s. 6d.; 50, 6s. 6d.; 51, 2s.; 52, 1s. 11d.; 53, 2s. 2d.

DEMERARA GREENHEART, £5 5s. per load.

HUNGARIAN ASH, 2s. 7d. to 3s. 4d. per foot cube.

JAMAICA, £7 per ton.

WALNUT BURRS, £50 to £72.

LANCEWOOD WHIP STICKS, 6 bundles, all at 65s.

ITALIAN WALNUT WOOD, withdrawn.

APROMATE, withdrawn.

ZEBRA WOOD, £6 5s. to £6 10s. per ton.

JAMAICA YELLOW WOOD, 4d. to 6¼d. super.
Do. 6 logs, no mark, 60s. per ton.

PENCIL CEDAR, per ton, £4 15s. to £5.
Do., per cubic foot, 2s. 10d. to 3s. 6d.

TRENAILS, £5 per 1000 of 36in.

QUEBEC WALNUT TIMBER, 3s. per cubic foot.

It is necessary here to give some description of the timber, in order that the price may be understood. The dimensions of 10 pieces will give a fair idea. It averaged about 45 cubic feet per log.

Length.	Squares.	Contents.
14	23½ × 24	55
11½	24 × 25	48
12	25½ × 24½	52
12	26 × 26½	57
10	21¾ × 24¾	42½
14	27 × 24½	64
14	25½ × 26¼	66
14½	24¾ × 25	62
10	23½ × 23	37½
12	25½ × 26½	56

SALE AT CHURCHILL AND SIMS', 27TH APRIL, 1870.

Archangel, best yellow, £12 to £12 5s. Petg. std.
Gothenberg, mixed, 4 × 9, yellow, £9 15s. to £10.
Do., battens, £9 5s. to £9 10s.
Do., mixed, 4 × 9, £9 to £9 10s.
Dram, yellow, £6 to £7 for 6½in.
Holmsund, mixed yellow, £8 10s. to £10, Petg. std.
Husum, 3rd yellow, £9, do.
Quebec, best floated, £16 5s. to £17, do.
Do., bright, £16 10s. to £19, do.
Do., broad, £21 10s, do.
Do., second floated, £12 to £13, do.
Smartwick, mixed, 2nd yellow, £8 15s., do.
Do., 2nd, 2½ × 7, do., £8 10s., do.
Do., 3rd, 2½ × 7, do., £8 10s. do.
Do., 3rd, 3 × 9, do., £9.
Pugwash spruce, £10 15s. to £12, for 9in.
Gefle, yellow, £8 15s, Petg. std.
Rimouski spruce, £13 to £15 for 9in.
Sandame, 3rd yellow, £9, Petg. std.
St. John's spruce, £12 15s. to £13 5s., for 9in.
Dram yellow balks, 28s. to £29s. per load.
Pitch pine, £10 to £11 5s., Petg. std.
Petersburgh, 1st white, £10 15s., do.
Christiana, 1st white, £13 5s., for 9in.
Quebec 1st white spruce, £18, do.
Fredrickshald and Fredrickstadt, 1st yellow flooring, 1¼ × 7 13s 6d., per square.
Do., do., 1¼ × 6½, 13s. 6d., do.
Do., do., 1 × 7, 10s. 9d., do.
Do., do., ⅞ × 6½, 8s. 6d., do.
Do., do., 1 × 6½, 10s. 6d., do.
Do., do., 1 × 6, 9s. 3d., do.
Do., do., ⅞ × 7, 8s. 3d., do.
Do., 1st white, ⅞ × 7, 8s. 3d., do.
Do., do., ⅞ × 6½, 8s. 3d. to 8s. 6d., do.
Do., do., ¾ × 7, 7s. 3d., do.
Do., do., ¾ × 6½, 7s. 3d., do.
Do., do., 2nd yellow, 1 × 7, 8s. 9d., do.
Do., do., 1 × 6½, 8s. 6d., do.
Do., do., ⅞ × 6½, 7s. 6d., to.
Do., do., ¾ × 6½, 6s. 3d., do.
Dram, 1st yellow, ⅞ × 6½, 6s. 9d., do.
Do., 1st white, 1 × 6½, 9s. 6d., do.
Do., do., ⅞ × 6½, 7s. 6d., do.
Fredrickstadt mouldings, 1s. 2d. to 4s. 6d. per 1000ft.
Do., ¾ × 2¼ slating laths, 1s. 5d. to 1s. 6d. per 144ft.
Do., architraves, 8s. per bundle.
Do., skirtings, 3s. do.
Do., ¾ × 1, pantile laths, 10d. to 11d. per 144ft.
Quebec yellow pine timber, 16 to 23in., 85s. to 87s. 6d. per load.
Do., do., 13 to 17in., 80s., do.
Do., Waney board timber, 17 to 25in., 80s. do.
Do., masts, 30 to 45s., do.
Do. red pine spars, 60s. to 80s.
Riga lathwood, £4 15s. per fathom
Petersburgh do., £5 do.

LATEST PRICES OF MATERIALS USED IN CONSTRUCTION.

TIMBER.

	£ s.	£ s.
Teak load	12 0	12 10
Quebec, red pine	3 15	4 15
„ yellow pine	4 0	5 0
St. John, N.B. yellow	0 0	0 0
Quebec oak	5 15	6 5
„ birch	3 15	4 15
„ elm	4 5	5 5
Dantzic oak	4 5	6 5
„ fir	2 5	4 5
Memel fir	2 5	3 10
Riga	2 15	3 5
Swedish	2 0	2 13
Masts, Queb. red pine	3 10	6 0
„ yellow pine	4 5	6 0
Lathwood, Dant. fm.	4 0	6 0
„ St Pburg.	6 0	6 10
Deals, pr C., 12ft by 3 by 9 in.		
Quebec, white spruce	12 10	17 10
St. John, white spruce	12 10	15 0
Yellow pine, per reduced C.		
Canada, 1st quality	18 0	19 0
2nd do.	12 0	13 0
Archangel, yellow	11 0	12 10
St. Petersburg, yel.	11 0	12 0

	£ s.	£ s.
Finland	6 10	8 0
Memel	7 0	9 0
Gothenburg, yellow	8 0	8 10
„ white	0 0	0 0
Gefle, yellow	9 0	10 10
Soderham	8 0	9 10
Christiania, per C., 12 ft. by 3 by 9 in yellow	10 0	12 10
Flooring Boards, per sq. of 1in., first yel.	7 6	10 0
First white	7 0	9 6
Second qualities	6 0	7 0
PUMICE STONE pr tn	6 0	8 0
OILS, &c.		
Seal, pale per tun	42 10	0 0
Sperm body	92 10	93 0
Cod	41 0	0 0
Whale, Sth Sea, pale	38 0	39 0
Olive, Gallipoli	56 0	0 0
Cocoanut, Cochin, tun	45 10	46 0
Palm, fine	40 0	40 10
Linseed	32 0	0 0
Rapeseed, Eng. pale	44 15	45 0
Cottonseed	31 0	36 0

METALS.

LEAD:—

		£ s.	£ s.
Pig, Foreign	per ton	18 2 6	18 5 0
„ English, W.B.	do.	19 7 6	0 0 0
„ Lead Co.	do.	19 0 0	19 2 6
„ Other brands	do.	18 7 6	18 17 6
Sheet Milled	do.	19 5 0	19 10 0
Shot, Patent	do.	22 0 0	0 0 0
Red or minium	do.	20 0 0	0 0 0
Litharge, WB	do.	0 0 0	0 0 0
White dry	do.	26 0 0	28 0 0
„ ground in oil	do.	26 0 0	29 0 0

COPPER:—

British—cake and ingot	per ton	70 0 0	71 0 0
Best Selected	do.	71 10 0	72 0 0
Sheet	do.	75 0 0	76 0 0
Bottoms	do.	78 0 0	0 0 0
Australian	do.	72 10 0	75 0 0
Spanish Cake	cash	0 0 0	0 0 0
Chili Bars	„	67 15 0	68 10 0
„ refined ingot		71 0 0	73 0 0
Yel. Metal Sheathing & Rods	per lb.	0 0 6⅜	0 0 6⅞

Trade News.

TENDERS.

BRITONFERRY.—For alterations and additions to Mr. Woodward's shop. Mr. H. Francis Clarke, architect:—

George	£258 15
Thomas	257 10
Treharne	222 5
Rees (accepted)	203 8
Jenkins	180 10

FRENSHAM VALE.—For additions to Frensham Vale, for Mr. Rennie. Mr. T. Wonnocott, architect. Quantities not supplied:—

	House.	Stables.	Total.
Birch	£1786	£295	£2 80
Duke	1450	250	1700
Nightingale	1400	320	1720
Goddard and Son	1300	298	1598

GUILDFORD.—For new stabling and additions to Stoke Hotel. Mr. Henry Peak, architect:—

Strudwick	£631 5 0
Mason	618 0 0
Smith	581 10 0
Pollard and Son	547 9 7
Footer	497 0 0
West (accepted)	475 0 0

HAMPSHIRE.—For farm buildings and pair of cottages at Sutton Scotney, near Micheldever. Mr. Henry Peak, architect, Guildford:—

Spackman	£772
Pollard and Son	691
Taylor and Downes	670
Fielder and Sons	658
Grace	644
Macklin (accepted)	585

HIGHAM FERRERS.—For additions to the Vicarage, Higham Ferrers. Mr. W. MacCarthy, architect:—

Fletcher	£387
Brown and Miller	371
Foskett	337
Piggott (accepted)	333

MANCHESTER.—For the erection of the Religious Institute in Corporation-street, for the accommodation of the Manchester and Salford City Mission Offices, and depôts for the Manchester Auxiliary Bible Society and Religious Tract Society. Messrs. Horton and Bridgford, architects, Manchester:—

Dawson	£5042
Warde	4963
Robinson	4815
Armstrong and Dow	4756
Bowdon and Edwards	4714
Statham	4560
Tickle	4437
Terras	4336
Clay	4320
Farrel	4284
Hurde and Eadie	4265
Davies and Mawdsley	4241
Wade, Brothers	4229
Southern	4165
Davison	4158
Connor	4130
Thompson	4051
Swindells and Little (accepted)	4051
Higham	4021

THE BUILDING NEWS.

LONDON, FRIDAY, MAY 6, 1870.

THE SOCIETY OF PAINTERS IN WATER-COLOURS.

WHAT a change has come over water-colour art since this society was first instituted, and, under the presidency of Gilpin, the sixteen newly elected members opened their first exhibition in Lower Brook-street in April, 1804. Here is at least a branch of art in which great progress has been made, for much as we may admire early water-colours for their delicacy, purity and good drawing, we must at least confess that the more intense colours now used are truer to nature than the delicate tintings over the shadows laid in in Payne's gray which were then in vogue, or even than the more life-like styles of Girtin and Varley. But the greatest alteration in water-colour art has been effected within the last twenty years by the introduction of body-colour, which, whether we look upon it as orthodox or not (Turner, we know, considered that by its introduction water-colour painting would lose all its individuality and beauty), has entirely changed both the art and the point of view from which the art should be criticised. For in the old times a work in water-colour was literally a drawing, *i.e.*, a topographic pencil sketch tinted in colours, now each water-colour is in truth a painting, differing only from an oil picture by the difference of the vehicle used in producing it.

The present exhibition contains many works of great merit, and continues to be as successful as ever, for was it not founded upon the policy that "as long as thou doest well unto thyself, men shall speak well of thee?" The members are all very fairly represented, only three, Messrs. Burton, Nash and Boyce, not exhibiting. The absence of this latter artist we must especially regret, as the originality in his works is always pleasing to us, even where his subjects are distasteful. We cannot speak favourably of Mr. Birket Foster's large work, "The Weald of Surrey," No. 12; the colour of the sky seems to us untrue, and the whole picture too much like a chromo-lithograph—a failing which a large number of works in this gallery share with it. No. 66, "Burnham Beeches," by the same artist, is a much better painting, though it is not exempt from Mr. Foster's too great prettiness of execution. The President of the Society, Mr. Frederick Tayler, sends five pictures, all marked by his usual ability. In No. 33, "Maternal Anxiety," a beautiful dog is anxiously watching its puppy being carried into a barn in a basket with some fruit by a country lassie. The dog is exceedingly well painted. No. 206, "Breaking the Park Palings to let the Hounds through," and No. 214, "Hunting in the Woodlands, Southern Hounds," are both good specimens of this artist's work, and show his power in delineating hounds and horses in action. No. 16, "A Farm Yard, Red Hill," and No. 23, "Ploughing" in the same neighbourhood, by C. Davidson, are very pretty and truthful bits of colour, wrought out with much steadfastness. This artist gets great freshness into his paintings, and always presents nature to us in a pleasing form. No. 89 is perhaps his best work. No. 24, "Waiting for the Ferry Boat, Rome," by Walter Goodall, is very agreeable in colour, and the face of the old priest, intently conning his Breviary to save time in his devotions, is well given. Mr. Burne Jones is very unequal this year in his painting, but we must not forget that he is one of those to whom belongs the honour of raising the standard of subjects for water-colour art out of the common scenes of every-day life into more poetic regions. He is never common-place, though he sometimes gains this exemption rather dearly by taking a paradoxical view of his subject. His picture called "Evening," No. 45, seems to us a complete failure; the light is false, the colour is nasty, and the hair of the figure is so badly painted that the crown of the head appears positively bald. No. 136, "Night," is a woman asleep. Entering at an open doorway the colour is rather too heavy, but the ripple of moonlight on the waves in the background is well given. "No. 64, "Love disguised as Reason," has many excellences, and there is very great tenderness of feeling and beauty in the two female figures on the right hand of the picture, but the figure of Love is somewhat unsatisfactory, from the heaviness of the costume. This is, however, partly redeemed by the severe grace of the action. The painting of the red garment in "Beatrice," No. 14, is very clever, and deserves much praise from the skilful way in which the folds are managed, and the texture of the brocade given; indeed, Mr. Burne Jones's painting of drapery (except in the picture "Evening,") will repay careful study. The colour of the flesh in this painter's largest work, "Phyllis and Demophoon," strikes us as much too olive in hue, and there is a blackness about the shadows which is very unlike the warm shadows and reflections of real flesh, especially when seen in the open air. Mr. Jones has here pandered to the mannerism of his particular school, and not studied nature. The face of the Athenian king who knew not how to love is finely rendered, as is also the tender sentiment, both of love and despair, in the face of the faithful Phyllis. Mr. Holman Hunt contributes two pictures painted in Italy. In No. 58, "Sunset at Chimalditi," the light is almost dazzling, but we must doubt the truth of the reflection on the distance. The cold hue of the green trees in the middle distance is very disagreeable. No. 71, "A Festa at Fiesole," is to us, with all its talent, an unpleasant work. The colour is rank, and the figures so out of place. Surely the little boy playing on a drum, in imitation of the soldiers, is very much out of drawing! A careful inspection leads us to believe that Mr. Hunt has intended to pourtray the setting sun through the trees (how many great men have tried this and failed!) but for some minutes, deceived by the title of the picture, we supposed it to be a sky rocket or Catharine wheel firework, let off in honour of the occasion. Mr. F. Smallfield is another artist of known power whose works disappoint us this year. His large picture, called "Dinner Time and Bed Time," No. 170, is not exempt from a grain of vulgarity, and the painting throughout is meretricious. The background is too hot for the cool colours of the foreground, and the face of the child is out of drawing. In No. 51, "Prima Donna Assoluta," the drawing is again defective, and in No. 134, "Condottiere," the head of the professional model is too apparent. Mr. Smallfield can do better things, as a very exquisite little work upon one of the screens, No. 221, called "Fuel Gathering at Fiesole, the Convent Wood in Autumn" proves. It is a charming little work. No. 114, "The Elixir of Love," by G. J. Pinwell, is a highly finished decorative painting of very great merit, and though perhaps there is a slight want of light and shade, the composition is excellent, and all the faces are extremely well wrought, the individuality of each one being most perfectly given. The subject is the sale of Love's Elixir by a mountebank from the market cross in mediæval times. On the right hand of the picture it has been bought by some young girls, whose beauty, according to an admiring group of swains, renders the purchase quite unnecessary, and in the centre it is possessed by an old couple far advanced in life. The musician, disappointed by his want of success, eschews any remedy for obtaining a return of the tender passion, whilst a mother wrapped up in her infant, and some children rejoicing in their toys, are quite indifferent to the value to be gained by its possession. It is altogether a very perfect work, and leaves upon the mind the same vague and tender impressions as does the memory of some well-known scene, or some evanescent and passing effect of sunlight. In one word, the commonplaceness of the matter of fact is here replaced by the charm of the ideal. Mr. Samuel Palmer contributes two works, No. 97, "The Curfew," when the bell of an old cathedral is resounding across the stretch of waters, and No. 105 "The Near and the Distant Southern Italy." The goat-herd is watching over his goats in the cool foreground, and the grapes are being picked by the road-side, along which some peasants and cattle are winding their way up to the quaint Italian town, perched among the hill tops, and beyond the glowing middle distance are the mountains capped with snow. No. 57, "A Cloudy Day in Autumn," by H. Brittan Willis, is sleepy and very much overwrought. All his works this year are very woolly in texture. This artist would do well to take warning by Hills, whose real genius in painting cattle was marred by this defect. No. 104, "The Arrest of Guido Fawkes," under which grand Italian title we recognise our old acquaintance Guy Fawkes, is a work of great effort, but here, though individuality has been sought after, it has not been obtained; the figure of King James is almost caricatured into deformity, and all the heads are big; there is also an unpleasant looseness in the method of painting. No. 189, by the same artist, is a better work, though the expression of the horse's eyes is rather human than equine. No. 145, "The Interior of Milan Cathedral," by Samuel Read, is a grand and powerful picture; the dim religious light coming in through the gorgeous glass windows is excellently rendered. The same artist sends two capital interiors, painted in the quaint old City of Nuremberg—No. 59, "The Shrine of St. Sebald," and No. 68, "The Sacrament House in the Church of S. Lawrence." No. 99, "Oxen going Home, Sussex," by Basil Bradley, is very agreeable in colour, though perhaps as a whole it is a trifle hot. Mr. Bradley exhibits also two very charming little views of Paris. "No. 63, Es Salaam, by Carl Haag," is clever, but full of the mannerism of this artist. Mr. F. Walker has but one work here on one of the screens, called "Wayfarers"—a boy leading a blind man along a wet country road, with the driving rain-clouds passing across the sky. It is one of the gems of the exhibition. Mr. Lundgren sends a number of small heads, all evidently make-ups from models, which will not advance his reputation. Mr. T. Lamont's two pictures, called "Bays" and "Laurels," are nice in feeling and colour, but deficient in drawing. No. 135, "A Gleam of March Sunshine," by C. Branscombe, is a clever landscape, painted with power and a true love for Nature. No. 83, "Prison Scene in the 'Vicar of Wakefield,'" by E. K. Johnson, is a very highly-finished work. The contrasts in it are rather strong. The rather coarsely-beautiful woman in the centre is not our ideal for Mrs. Primrose. No. 124, "The Town of Quimper, from the Brest Road, Brittany," by T. Burgess, has much originality, and the feeling of a bright evening after a stormy day is well rendered. The better half of mankind, so eloquently alluded to by Mr. C. Dickens in his speech at the Academy dinner, do not shine here yet. Surely this is an art in which ladies might well excel. The large flower groups by Maria Harrison are little short of execrable, and No. 80, "The Dead Bird," by Mrs. H. Criddle, is a most washed-out performance. No. 101, "Cleve Lock, near Streatley," by G. A. Fripp; No. 179, "At Aldborough, Sussex," by P. J. Naftel; No. 210, "Lock Torridon," by A. W. Hunt; No. 195, "Apples and Filberts," by V. Bromley, are all clever paintings, and deserve longer notices, but our space is so limited that we must request our readers to go and criticise for themselves, assuring them that they will find very much to admire in this society's present exhibition.

Furniture & Decoration.

THE THEORY AND PRACTICE OF MODERN HOUSE DECORATION.

By an Experienced Workman.

ON THE NATURE AND USES OF THE OILS, VARNISHES, DRIERS, &c., USED BY THE HOUSE PAINTER AND DECORATOR.

(*Continued from page* 328.)

THE principal varnishes and siccatines used by the house-painter are the following, which each maker distinguishes by his own superlative, such as super, fine, best, &c. The copal varnishes, if made with the pure gum, may be considered as the best for all purposes. Varnish manufacturers profess to make a superior elastic body varnish which is suitable for one purpose and not for another; they will tell us that this may be used for outside work on any surface work which is much exposed to weather, and that it will preserve its brilliancy for years and never crack by exposure. All we can say is, don't believe it, for experience has proved that no varnish yet manufactured will stand, keep its polish, and never crack when exposed for years to sun and frost, leaving other influences out of the question.

Then there is super copal polishing varnish, and super copal carriage varnish, which is described as fine, clear, elastic, durable, &c. French oil varnish is a polishing varnish also much used of late years for varnishing all light-coloured work and for polishing. It is a capital varnish in working, and it will polish well, but it has one great defect: although it lays on well, and floats and comes up to a fine polish, it never gets hard, but after it has been done for years it will give under pressure. It seems to get hard on the surface, but not throughout its body.

The above are all what are called first-class varnishes, ranging from 20s. to 40s. per gallon, and are principally pale varnishes supposed to be made from the best gums; but there are a number of common varnishes made from the darker-coloured gums, and which are used for inferior purposes, such as mahogany varnish, oak varnish, super copal oak varnish, &c., varying in price from 6s. to 16s. per gallon—many of them really good varnishes for common purposes.

We can scarcely lay down any rule for selecting varnishes without trial; much will depend on the reputation and position of the maker. Oil varnishes require to be kept in stock a considerable time before being used, their good qualities being improved thereby, and they bear a better and more permanent polish or lustre in consequence. There are some old firms who are able to hold thousands of gallons in stock, and are thus enabled to supply their customers with varnish in a proper state for use. All good varnishes work freely and float evenly when laid on properly, and bear a smooth, even polish, free from nitts or small specks of undissolved gum. We suppose it is scarcely possible to make an oil varnish altogether free from these specks, and we are led to this conclusion by the fact that it is an exceedingly rare circumstance to find any varnish free from them. Common or cheap varnishes are often filled with these specks, and, as a rule, they may be recognised by this fault alone, as the manufacturer cannot afford to take the necessary trouble and time to strain and clean them from the undissolved gum, which is necessarily a slow process in working. Poor varnishes lay on unevenly, don't float well, and dry with an unequal polish, some parts brilliant, other parts dull; and if there happens to be a little more varnish on one part than another, it will most likely ruckle up or wrinkle in parts, which fault cannot be rectified except at considerable trouble and cost. Poor varnishes lose their gloss in a very short time, and become white and filmy-looking, thereby obscuring the work they were intended to preserve and beautify. It may be set down as a rule that all quick-drying oil-varnishes are liable to crack, and will not retain their lustre for any considerable length of time; on the contrary, that all slow-drying varnishes will not only become hard when thoroughly dry, but will retain their polish for a much longer period than the quick-drying. From twenty to forty-eight hours is the time which all really first-class varnishes require to dry. We put no faith in quick-drying varnish. It will, of course, be understood that if the varnish is good much depends on the manner of laying it on the work. Good varnish may be spoiled by bad workmanship. It seems an easy matter to lay on varnish, but such is not the case; much care and experience is required. In the first place, before commencing, the workman should see that his brushes, tools, and vessel are perfectly clean. It is not sufficient to just wash his brush, but he must see that there are no particles of paint or varnish remaining at the roots of the bristles, because if there are they will be sure to come out on to his work and thus spoil the best varnish that ever was made. The fault of roughness and nittiness is often laid on the varnish when it solely results from the carelessness of the workman. The varnish should be laid on freely, and crossed and recrossed until it begins to set or ceases to flow or run; by this means a good body may be laid on without danger, and will turn out creditably both for workmen and varnish. On the other hand, if care be not taken to spread it evenly and regularly more varnish will collect in one part than another, and bad work will be the result. Another important point is to see that every particle of grit or dust is removed from the work before commencing varnishing, as there is nothing picks up the dust and grit so soon as the varnish brush, and once the dust gets into the brush it is hopeless to to expect good work until it is thoroughly cleaned again; not only so, but the grit or dust gets into the varnish in the vessel out of which he is using it, and thus spoils the whole of it.

All users of varnishes will have observed that with some varnishes, after work has been done some time with them, a film or bloom will make its appearance on the surface of the varnish, somewhat like the bloom on the peach or plum, which obscures and disfigures the work it was intended to improve and preserve. Now whether the fault lies in the varnish used or the manner and circumstances under which it is used has been a vexed question with artists and decorators for a long time. We do know that thirty years ago our varnishes seemed to be freer from this fault than they do now; whether this arose from the greater purity of the gums and freedom from adulteration, there not being the necessity nor the skill to adulterate in those days as now, we cannot say, but our experience points to that conclusion. Much stress is laid by most writers on varnishes on the absolute necessity of varnishing being done upon a fine warm dry day in order to prevent its blooming. The advice is good as far as it goes. Varnish will dry better on such days than on wet muggy days, but unfortunately it does not prevent varnish blooming. It will be evident that the house painter has to varnish his work in all sorts of weather, wet or dry, bad or good. He cannot wait for a favourable day; being generally tied to time to finish his work, he must varnish his work as soon as it is ready, without regard to weather, consequently he has to risk both cracking and blooming. Varnish makers say the fault is not in the varnish, but in the manner of its using. We have had between thirty and forty years' experience in the matter, and we are bound to dissent from this view of the question, and may say that we are convinced that the fault is inherent in the varnish, and not in the manner of using or the circumstances under which it is used. The state of the weather at the time will have some influence upon it, but we have used varnishes under all circumstances of weather and situation, and we have invariably found that a varnish that will bloom in wet weather will do so in dry weather also. We have repeatedly seen this tried in draughty lobbies and staircases, outside work and inside work, on wet days and dry days, and the result has always been the same. The fault is not confined to poor varnishes alone—in fact, poor or rather cheap varnishes are freer from it than the more expensive ones. The result is the same if copal body, French oil, carriage, white Coburg, or any of the most expensive varnishes are used.

We would ask the varnish manufacturers as a body why it is that one making of varnish shall be liable to bloom under all circumstances, and another batch by the same maker shall be free under all circumstances from that defect? We are inclined to think that the fault may arise either from some inherent defect in the gum, or from inattention to some small matter in the process of manufacture, which, by careful watching, might be discovered, and this grave defect avoided. We have been informed, on reliable authority, that a sort of bloom exudes from some gums naturally, and that acids are used in the cleaning of the gums in order to destroy this bloom. It would not do for the varnish makers to admit that the fault was in the varnish, but we have no hesitation in bearing our testimony to the truth of the facts.

When varnish has bloomed we have found that the only effectual remedy is to cut it down and polish it, but that is of necessity an expensive process, and therefore not admissible in most cases. We have, however, had recourse with considerable success to the following method of removing the bloom:—First, wash with a weak solution of white soap in water, clean off well with pure water, then take pure linseed oil, and with a cotton boss or rubber—*i.e.*, a piece of silk enclosing a ball of cotton wool about 3in. in diameter—gently rub the oil well over the work, not sparing labour in rubbing. Clean the oil well off with soft cotton cloths, and rub up to a polish with an old silk handkerchief, taking care not to scratch. In putting on the oil or in polishing, the direction of the motion of the hand should be in a circular direction, and not straight up and down or across. The latter motion leaves the polish in streaks, while the former produces a smooth, even lustre.

(*To be continued.*)

Mr. Barry and the Birmingham Architectural Society.—At a meeting of the Birmingham Society of Architects, on the 28th ult., it was resolved, "That the Birmingham Society of Architects being of opinion that, by the rules and practice of the profession, the drawings of an architect are his own property, desire to assure Mr. Barry that he will have their support in resisting the demand of the First Commissioner of Her Majesty's Works to deliver up the drawings prepared for the Houses of Parliament."

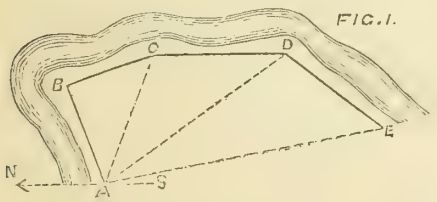
Torquay Police Courts.—Twenty-one designs were submitted in this competition, and Mr. E. H. Harbottle, architect, Topsham, being the successful competitor, will be entrusted with the supervision of the work.

The New Town Hall at Bradford.—A rumour has got abroad, though according to a local paper without the slightest foundation, that the site of the new Town Hall at Bradford was to be changed from the unshapely position at New Market-street to the site of the canal basin, near the Midland Railway Station. The rumour may have had its origin in the delay in advertising for tenders for the works, and in the proposal by the Corporation to purchase the canal property. The plans for the erection of the new Town Hall have long been sanctioned by the Town Council, and the apparent delay in commencing the work has arisen from the fact that the preliminary preparations by the architects are not completed, but are shortly expected to be ready.

The Surveyor.

TRAVERSING.

WHILE all surveying may be classed under the two general heads of "chain" and "instrumental" surveying, there is a peculiar description only applicable to particular cases, which is known as "traversing." Traversing, or surveying by a traverse, has, it is true, but a limited range, but for examples within that range it is preferable to all other methods for executing the work. The especial instances for which it is so well adapted are those in which the length of the area to be surveyed greatly exceeds the breadth, and the direction of the lines is continually changing. As a practical case in point, a winding river or crooked road may be taken, the object of the survey being supposed to be principally the determination of the course or route, with perhaps some small amount of land on each side. A long, crooked strip of land is the proper example for making a survey by traverse. To begin with a simple instance, let fig. 1 represent a portion of a river, the



course of which is required to be laid down on paper, or "plotted," as the technical phrase is. The easiest method of effecting the survey is by traversing. In this description of field work both the chain and an angular instrument are employed. The latter may be a theodolite, a pocket sextant, or a prismatic compass, provided the nature of the ground will permit of the use of the two last mentioned. This is not always possible, so that it will be assumed that the theodolite is the instrument selected, as, indeed, it ought to be. The first step consists in setting up ranging rods at or near the bends or "elbows" of the stream at the points A, B, C, D, and E, and the operation clearly becomes reduced to a measurement of the lines joining those points, and an observation of the several angles made by their different directions, either with reference to some fixed standard or datum line, or to one another. Supposing A in fig. 1 to be the first station or starting point of the traverse, the simplest case that can occur is when all the points are visible from it. The line shown by the arrow, and marked N S, is the datum or line of direction, and may be the meridian line or not, at the option of the observer. It is sometimes convenient to take it as the magnetic meridian, but it will be called here the line N S.

Having set up the theodolite at A and accurately adjusted it for observation, the angles N A B, N A C, N A D, N A E should be measured, which gives not the position, but the direction, of the points B C D E. The position of the points may be obtained by measuring the lines A B, B C, C D, D E. Having measured A B, it can be plotted along the line of direction given by the laying down of the angle N A B, and the point be ascertained. If from B a circle be struck with a radius equal in length to the line B C cutting the direction given by the angle N A C, the point C will be determined, and so on for the other points D and E. From what has been already stated with respect to trigonometrical surveying, it is evident that were it certain that the angles and distances were accurately measured, nothing more would remain to be done than to set off the ordinates or offsets from the lines A B, B C, &c., and so obtain the boundary of the river. But there is really no check on the operation. All the points B C, &c., might be wrong in position without there being any evidence to show it. If the position of the last point could be checked the work might be considered correct. The position of C can easily be verified in the triangle B A C, for the angle B A C is known, and the length of the two sides A B, B C. If the angle B C A be assumed as the check, we have by the usual trigonometrical formula

$$A B : B C :: \text{sine} \angle B C A : \text{sine} \angle B A C,$$

$$\text{and therefore sine } B C A = \frac{A B \times \text{sine } B A C}{B C}.$$

But the accuracy of the position of the points B and C is no check upon that of D and E, which cannot be checked in the same simple manner, as in the respective triangles A C D, A D E, only one side and one angle are known, which are not sufficient data for calculation. But if the accuracy of the position of the last point E, as previously determined, could be verified, it might be fairly presumed that that of the intermediate points was correct, since they served as back stations for determining E. The shortest plan will be to neglect the intermediate points altogether, and to measure either of the lines A D, A E and observe the angle A D E. The position of E can then be verified by calculating the remaining angle A E D or the distance D E, which should agree with that already plotted. The distance D E will be given by the equation

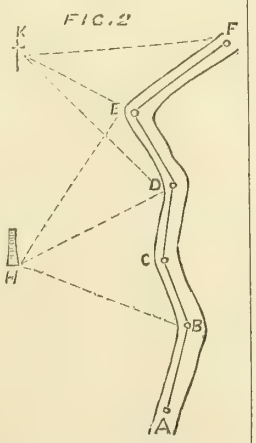
$$D E = \frac{A E \times \text{sine } D A E}{\text{sine } A D E},$$

supposing the distance A E to be measured. If, on the other hand, A D be measured, the angle A E D may be obtained from the formula—

$$\text{sine } A E D = \frac{A D \times \text{sine } D A E}{D E}.$$

The distance D E can be checked when the line A D is measured instead of A E, but the calculation is rather more tedious, as it must be made by the formula which includes the tangents of half the angles opposite to the two sides.

We may now proceed to consider the more general case shown in fig. 2, which represents the traverse of a road. Rods are fixed up at A, B, C, D, E, and F to indicate the bends and the respective stations at which the theodolite is to be set up. It may be here stated that it is optional with the surveyor to take all his angles consecutively on the instrument or to take them separately. That is, he may read his angles constantly without ever setting the vernier to zero except at the commencement, or he may set it to zero at the back reading of every station. The former is the preferable method, as it affords greater facilities for plotting than the other. This will be seen as we proceed. Referring to fig. 2, the theodolite will be set up at B, the vernier set to zero on the lower plate, the telescope directed to the rod at A, and the lower plate clamped. The upper plate is then unclamped and the angle A B C read off, but before reading this angle, should there be any object, such as a chimney, shown at H, or a church spire, or a very prominent and well-defined tree, the angle A B H should be observed, as it will, by the aid of other observations, serve as a check upon the accuracy of the work. The angle A B C having been read, the upper plate is clamped so as to retain the reading, and the instrument is then



transferred to station C. The lower plate is then unclamped and the telescope directed to the last station B. It must be borne in mind, from what has been previously said, that in this instance A B is the meridian or fixed line for the traverse. When the telescope is accurately adjusted to "sight" B, the lower plate is clamped, a glance is given at the vernier to see that it has not stirred and that it still reads the same angle as before, and the upper plate is then unclamped and the angle B C D taken. A repetition of this process at the successive stations completes the traverse, care being taken to check the observations by observing the angles between any station and other prominent objects in the neighbourhood, as shown in fig. 2 by the dotted lines. In a long traverse, in order to save the inconvenience and liability to error incurred in plotting, by carrying parallel lines across a large plan, one or two meridian lines are selected. There is no difficulty in effecting this at any point in a traverse. Supposing (see fig. 2) that when the surveyor arrived at E it was desirable to select a new meridian or fixed line. Let E D be the new direction of the line. Then all that is necessary to do is, when the theodolite is set up at E and the telescope fixed upon D, to set the vernier to zero on the lower limb, and recommence the succeeding angles from that reading. If it be required to commence again from the actual magnetic meridian, it is only necessary to set the telescope and the zero of the vernier to that direction and proceed with the angles as before. Whenever the instrument is never reset to zero during the whole of a traverse, that is, when the meridian or fixed line is a constant, all the angles can be plotted off on the plan at one placing of the protractor, and all that remains is to lay off on each line its proper length. The successive lines are obtained by drawing at the termination of the preceding one, lines parallel to the directions of the several angles plotted from the protractor. It is from the well-known difficulty of accurately transferring parallel lines across a large sheet of paper that it is requisite in large traverses to select two or more meridian lines. Before assuming any line as a new meridian, great care must be taken that its direction is well verified by independent observations, as it will form the basis of a part of the traverse. Any error in it will be perpetuated throughout the traverse, and so for corresponding mistakes in other lines. To obtain an efficient check upon the position of any object, such as H or K in fig. 2, it should be remembered that three observations are necessary. Two are not sufficient, any more than two lines are sufficient by their intersection to determine the position of a point. Thus, referring to fig. 2, the three angles K F E, K E D, and K D H are necessary to check the accuracy of the position of the weathercock at K from the stations in the traverse. If, when these three angles are laid off on the plan, the lines all intersect at the same point K, its position may be considered correctly defined. Traverse surveys are not generally required to be conducted with the same degree of precision as those of a more extensive and important nature. But it must not be supposed that on that account there will be any excuse for negligent and slovenly work. Just as much care and attention can be displayed, proportionally, in a rough sketch or plan as in a finished drawing or map.

PAROCHIAL ASSESSMENTS.

(*Continued from page* 318).

A MECHANICS' institution, some of whose rooms are occasionally let out for concerts, lectures, and public meetings, is not exempt (Purvis v. Trail, 18 L. J. R. M. C. 57); nor is a subscription library, if a part of its premises are let off to another scientific society (Earl of Clarendon v. S. James', Westminster, 20 L. J. R. M. C. 213).

National schools, hospitals, dispensaries, and other similar properties held for public purposes

only, where the trustees derive no personal pecuniary profit for themselves, have, until very recently, been considered to be exempt from rates; but the case of the Mersey Docks and Harbour Board *v.* Jones and another (30 L. J. M. C. 239), carried by appeal from a judgment of the Exchequer Chamber to the House of Lords, has established the contrary rule. Six of the judges assisted the Peers when the argument was heard, of whom five expressed opinions that the exemption could not be supported. The remaining judge considered that the exemption had been established by a long current of authorities, and could not now be rejected. Since this decision was given, "The Sunday and Ragged School (Exemption from Rating) Act, 1869," has been passed, by which every authority having power to impose or levy any rate may exempt from the payment of any rate for any purpose whatever any building or part of a building used exclusively as a Sunday school or ragged school.

Much litigation has arisen, in connection with the assessment of buildings, concerning the rateability of fixtures, trade plant, and machinery. It was decided in the case Reg. v. Southampton Dock Company (20 L. J. M. C. 162) that buildings to which machinery is attached for the purposes of trade are assessable to the extent of their existing value as combined with the machinery, whether such machinery be real or personal property. In the case of the Queen v. North Staffordshire Railway Company (30 L. J. M. C. 68) it was decided that "things so attached to the freehold as to become part of it," and "things which, though capable of being removed, are yet so far attached as that it is intended they shall remain permanently connected with the railway or the premises used with it, and remain permanent appendages to it, as essential to its working," are rateable.

In the case of the Queen v. The Phœnix Gas Light and Coke Company (L. R., Vol. I., p. 241) it was decided that the retorts, purifiers, gasholders, steam engines, and boilers are parts of the works which are absolutely necessary to the manufacture of gas, which is the purpose of the company's undertaking; that it was intended when those things were erected that they should remain permanently connected with the premises, and that they should remain permanent appendages to it, as essential to its working; and, if not forming part of the freehold, they are still so far connected with it as to be intended to be permanently attached to it, and therefore they ought to be taken into account in determining the rateable value of the land and premises. Without the retorts, purifiers, steam engines, and gasholders the premises would be worthless for the purpose for which they were erected—the building would not be a gas manufactory at all. All these things are fixed, and so far annexed as to be intended to be permanent, and being really necessary for the use of the premises as gas works, they therefore form part of the rateable subject.

So in the case of a railway, although the sleepers are in no way fastened to the ground, but are laid on and packed up in ballast, and the rails are laid on and bolted to the sleepers only, nevertheless, it has been held that they form as much parts of the rateable hereditament as does a house, the foundations of which only rest upon a bed of concrete (Great Western Railway v. Melksham, J. P., Vol. 34, p. 102).

Utensils in trade and furniture are not rateable. The meters of a gas company were held, in the Phœnix Gas case already referred to, to be mere ordinary chattels, kept for the purpose of measuring the gas, and in no sense part of the gas works. In the North Staffordshire Railway case, things movable, such as office and station furniture, were held to be chattels, and not rateable. In many cases, such things as a mirror fixed to the wall have been held to be furniture, and not rateable; but a billiard table fixed to a floor has been held to enhance the value of the house to which it was attached, and in that way to become rateable. Power looms in a silk mill, portable and continually moved from place to place, but steadied by their feet being screwed to the flooring, are not rateable. (Reg. v. Overseers of Halstead, J.P. 1867, p. 373). It was held that, although such fixtures are no doubt fixed to the freehold, they are, nevertheless, not so fixed as to make them part of the freehold, so that on a demise they would pass with the premises.

"Tithes impropriate" are those which have been severed from a benefice, and are now payable to some lay person or corporation.

"Propriations," or "appropriations of tithes," are tithes severed from a benefice, and annexed to a spiritual corporation.

These are the only description of tithes expressly referred to in the statute of Elizabeth; but all tithes arising within the parish are rateable, and, every rent-charge payable instead of such tithes is subject to all rates and taxes, in like manner as the tithes commuted for such rent charge have heretofore been subject (6 and 7 Wm., ch. 71, s. 69).

Coal mines, in occupation in the parish, are rateable for what they produce; that is to say, at such a sum as they would let for. But, as has been already explained under the head of land, all other mines have been held to be exempt, because coal mines are especially made liable.

Saleable Underwoods.—The statute of Elizabeth especially refers to saleable underwoods, and specially makes them rateable. In the early cases, saleable underwoods were defined as being "wood which grows expeditiously, sends up many shoots from one stool, the root remaining perfect, from which the shoots are cut, and producing new shoots, and so yielding a succession of profits." But, in a recent case, Lord Fitzhardinge v. Pritchett (Law Rep., Q. B. Cases, Vol. 2, p. 141), Mr. Justice Mellor has very clearly defined what woods are saleable underwoods within the meaning of the statute of Elizabeth. He says, "the question does not depend upon whether the woods consist of what are timber trees, either by general or local custom; the nature and quality of the wood is not the test, but, wherever the woods are treated so as to raise successive crops from the same roots and stools, and, whether the crops ripen, and are cut at intervals of ten, fifteen, or even thirty years, is immaterial; or, whether the woods consist of oak, ash, or elm, which are universally timber trees; or of beech, which may be timber by custom; or willow, the stools of which can be and are so treated as to produce a succession of saleable crops; in such cases, the woods are saleable underwoods."

Mode of Valuing Property liable to be Rated.—There are two estimates required by the statute 6 & 7 Wm. IV., c. 96, which regulates parochial assessments, viz., "gross estimated rental" and "rateable value."

The former is the rent at which the property might reasonably be expected to let from year to year, the tenant paying all usual tenant's rates and taxes and tithe commutation rent-charge (if any), the landlord bearing the cost of repairs and insurance and other expenses (if any) necessary to maintain the premises in a state to command such rent. The rateable value is so much of the gross estimated rental as remains after deducting therefrom the probable average annual cost of the repairs, insurance, and other expenses necessary to maintain them in a state to command such rent, as aforesaid.

The actual words of the statute are very simple when understood; but, it is probable that no words in any statute were ever more misunderstood, or ever caused more confusion and gave more trouble than they did. They are as follows:—

"No rate for the relief of the poor in England and Wales shall be allowed by any justices, or be of any force which shall not be made upon an estimate of the net annual value of the several hereditaments rated thereunto, that is to say, of the rent at which the same might reasonably be expected to let from year to year, free of all tenant's rates and taxes and tithe commutation rent-charge (if any), and deducting therefrom the probable average annual cost of the repairs, insurance and other expenses (if any) necessary to maintain them in a state to command such rent."

Soon after the passing of this statute, viz., on the 3rd of March, 1837, the Poor Law Commissioners issued a circular defining gross rent as the rent which would be paid to a landlord who himself undertakes to pay all the usual tenant's rates and taxes with which the hereditaments or premises rented by the tenant are chargeable, together with tithe commutation rent-charge, the expense of upholding the buildings in tenantable repair, insurance against loss by fire, and any other expenses, if any shall exist, necessary to maintain such hereditaments in a state to command such gross rent. Net rent they defined as the amount which is received by or which remains clear in the hands of a landlord after all such taxes, charges, and expenses, as are above enumerated shall have been provided for.

Acting upon these definitions, many surveyors included in their estimates of gross estimated rental the whole of the rates and taxes usually paid by the tenant. For example, in the case of a house worth £100 per annum to a yearly tenant, the rates and taxes upon which amounted to £20 per annum, and the average cost of insuring, repairing, and maintaining the property £20 per annum, they called the gross estimated rental £120, the rateable value £80.

So far as regards the mere payment of poor rates, no injustice was done to the ratepayer; but, in the case of other uses made of the gross estimated rental it became apparent that the intentions of the Legislature had been misunderstood; moreover, valuations so made seemed to estimate the value of property in a parish unfairly and unnecessarily high. It very early became the practice to disregard the instructions of the Poor Law Commissioners and to omit all consideration of rates and taxes in making valuations, and in 1859 the Poor Law Commissioners were advised by the then law officers of the Crown (Sir Fitzroy Kelly and Sir Hugh Cairns) that the term "gross estimated rent" meant the rent at which the property might be expected to let, the tenant taking the burden of rates and taxes and tithe upon himself. In other words, they were of opinion that the word "free" in the statute must be considered as referring to rent and not to hereditaments.

An attempt was made in the Union Assessment Committee Act, 1862, to remove the doubts which had existed: but without much success, so far as ordinary ability can comprehend it. Nevertheless, the opinion of the law officers in 1859 is now universally acted upon and generally understood.

It must always be borne in mind that the rateable value is not the actual rent at which a property may be let; but that rent at which, after taking all things into consideration, it might reasonably be expected to let. Moreover, it must be remembered that the circumstances to be taken into consideration in estimating the value must always have reference to the period at which the valuation is made.

A house which on the completion of a railway, or some other public improvement, will be worth £100 a year, may at the present time be worth only £50 a year. While it is worth £50 it must be assessed at that sum only; but, as soon as the improvement takes place, the assessment must follow the increased value. Again, the rent reserved in a lease may not be evidence of rateable value. A property may possess a gradually increasing value, extending over many years. A lessee, in agreeing to pay a fixed constant rent, would average those circumstances. The rate must be made on an estimate of the annual value from time to time; low, when that value is small, and higher as it increases. Again, property may, from unforeseen circumstances, increase or decrease in value during the term of a lease. If it should increase, it would be unfair to the other ratepayers, who might not be similar lessees, if the assessment upon it were not increased; and, if it should decrease in value, it would be unfair to the lessee not to decrease the assessment. The term from year to year must not be misunderstood, as it sometimes is. It does not mean a letting for a year only, nor a letting on a yearly tenancy; but, it means that changeable circumstances must be taken into account from year to year as they arise.

Valuation of Agricultural and Accommodation Lands—In addressing the Institution of Surveyors, it is quite unnecessary to attempt to explain the mode of valuing agricultural or accommodation land. Nevertheless, it is well to again point out that the rateable value is not the rent actually paid either on a yearly tenancy or under a lease; but that it is the rent which, all things considered, a tenant might be reasonably expected to pay for the year next following the making of the valuation. The late Lord Denman, whose judgments were always as clear as it is possible for judgments to be, in delivering judgment in the case of a brick-field appeal, says:—"It may well be that, although at the end of the year the lessee has made so many bricks that he can afford to pay £150 in royalty to his landlord, yet he could not prudently, at the beginning of the year, contract, at all events, to pay more than £100, and, if so, the latter rather than the former will be the sum at which the land may reasonably be expected to let from year to year."

So, in the case of accommodation lands; a piece of meadow land may be situated in the

middle of another estate and in front of the drawing-room windows of the occupier's house. It is reasonable to suppose that, in such a case, the occupier of the house would give more rent for the meadow land than its value for agricultural purposes would justify, and therefore it possesses a corresponding rateable value; but, if such land becomes by purchase a portion of the other estate, it then possesses no greater rateable value than the adjoining lands, of which, in fact, it has become part. Small pieces of land adjoining a town will often let at rents quite disproportioned to their agricultural value, and their rateable value is such a rent as they may, in that way, be reasonably expected to fetch, notwithstanding that exactly similar adjoining lands which form part of an adjacent farm can only be reasonably expected to let at their agricu tural value.

The difference between the gross estimated rental and the rateable value of land is very small, and, in practice, it has hitherto, for the most part, been disregarded; but "The Valuation (Metropolis) Act, 1869," fixes the allowance, in metropolitan districts, at five per cent., and therefore it is presumed that such an allowance will very generally be made in all places in the future. It may be mentioned that, in the case of lands subject to tithes, the amount of the rent-charge should be deducted from the estimates of both gross and rateable value, the tithe rent-charge being itself rateable as a separate hereditament.

Valuation of Houses.—The gross estimated rental of a house is that rent which a tenant might reasonably be expected to give for the right to occupy it for one year, assuming that the landlord bore the expense of insuring, repairing, and upholding it. The net rateable value is the rent which a tenant might be reasonably expected to pay who took upon himself the expense of insuring, repairing, and upholding it.

The *rent* is the rent to be expected for the year following the making of the rate; but the allowance for repairs is to be the probable average annual cost. To give but one instance: general painting, which occurs only once in seven years, is not to be allowed in the year in which it actually is done to the exclusion of all other years; but a fair average annual charge on account of it is to be taken. In addition to the allowance in respect of indispensable repairs, an allowance is to be made in respect of contingent or future renewals. In the case of The Queen v. Wells (Law Reports, Q. B. Cases, Vol. 11, p. 548), the most recent decision upon this point, Lord Chief Justice Cockburn stated that there seems no distinction in principle between a sum annually laid by to make good, when it shall become necessary, an inevitable loss by the destructive agency of time, and a fund laid by for an indemnity against a loss by fire or storm, or other peril, insured against.

(To be continued.)

PARLIAMENTARY NOTES.

Decoration of the Houses of Parliament.—Mr. A. Seymour, on Friday last, asked the First Commissioner of Works if it was true that he had the intention of substituting any other material for mosaic work in carrying out the designs for the decoration of the Central Hall of the Houses of Parliament; and, if so, what materials he was prepared to substitute.—Mr. Ayrton said that the subject of decorating the halls of the Houses of Parliament, and the central hall in particular, was still under consideration. No conclusion had yet been arrived at, and he could not, therefore, tell the hon. gentleman what steps would be taken.—Mr. Seymour asked the hon. gentleman if he had it in contemplation to substitute anything for mosaic work.—Mr. Ayrton could only say that would be done which, on full consideration, would be found to be best.

Road Steamers.—Mr. Cogan, on Monday, asked the Secretary of State for War whether his attention had been directed to Mr. Thomson's road steamer or traction engine; if so, whether he had obtained any information as to its capabilities for military purposes; and if he had, whether he would communicate such information to the house.—Mr. Cardwell said that a favourable preliminary report had been received, and the whole subject was under the consideration of two experienced officers.

Metropolitan Building and Management Bill.—In reply to Mr. Dillwyn, Sir W. Tite said he would postpone the second reading to Monday next, and, if read a second time, refer it to a select committee.

The Fine Arts.

THE INFLUENCE OF THE FINE ARTS ON CIVILISATION.*

(Continued from page 315)

And here I cannot help briefly alluding to a prevailing error, which is fatal to the thorough appreciation of music; I mean the treatment of melody and harmony as separate qualities, whereas they are not only inseparable, but the former is under the control of the latter, inasmuch as every note is changed by its position as an interval. One brief example will suffice to explain my meaning. The key-note of Mendelssohn's "Wedding March" is C, and the top note of the first chord is also C; but though nominally they are the same notes, virtually they are not so, and to a perceptive ear have a different sound. So, to fully appreciate an operatic production, it is necessary to fix our attention equally on the instrumental as on the vocal parts.

To resume. Even in rendering human character have poets and painters been more successful than Mozart—especially in his opera of Don Juan? Every character is so distinctively marked that, without the aid of the singers, you may assign their respective parts. Nor has Music less the power of expressing at the same moment the most opposite emotions, of which I will simply give you two examples. In Mozart's opera, where Leporello is told to invite the statue to supper, how admirably are expressed the fear of the servant and the bravado of the master, and without any discordant effect. The second example—and more intricate in character—is from Gluck's opera of Alceste. Admetus, the husband of Alceste, according to the reply of the oracle, can only recover through the most noble sacrifice in human power to make. His wife offers herself, and Admetus recovers. Rejoicings are held in the palace, dances are going on, and at the same time Alceste alone is pouring out her sorrow; yet the whole is harmonious in the highest degree.

In putting before you these examples of the intellectual power of music, I have been led by a desire to claim for it that influence on civilisation which, owing to its very supremacy over the moment, is popularly denied it in a more extensive degree. For the more spiritual the art the less will its highest efforts attain the desired end, and the more will vulgarity be the result of its lower efforts to obtain popularity. No doubt, if we were to accept the almost universal appreciation of music as an evidence of public taste, the latter must be in a very satisfactory condition. But as in other arts the rabid desire for new books and pictures is by no means the result of intellectual wants of a high order, so I cannot look upon the success of nigger minstrels and music-hall vocalists as an evidence of refined taste or of the real progress of the art itself; nor under such circumstances has any art a chance of asserting its claims to a higher recognition than may be bestowed on any other successful medium for enhancing the pleasure of the fleeting hour. It is unjust to lay the whole, or even the chief blame on the artist, for the laws of supply and demand affect—though in a less degree—the productions of art as of manufacture; and if we complain of the mawkishness and vulgarity of the music of the day, in comparison with that of the past, we must remember that the mean intelligence of the employers requires a corresponding degradation on the part of the employed. Nevertheless, though the artist cannot elevate the taste of his audience unless he can fix their attention, his duty is, whilst pleasing them, yet more to instruct them. And those artists are deserving of the highest censure who, whilst professing a sincere desire to improve public taste and a contempt for mawkishness and vulgarity, can find no better means to stimulate the public than by appealing to their low craving for novelty. I do not object to novelty, so long as it is a fresh application of fixed rules, and not merely a departure from established form. But the latter motive has too much influence on our artistic reformers. Some apostles of music—loud in their appeal, as apostles ever are—have, within the last ten years, preached a creed the benefit of which they not unwisely bestow on the future. Living in the present, I, for one, cannot accept it, for I find in the works of those apostles a total disregard of melody and harmony, which are, as I have already said, the direct means at a musician's disposal; and I can only pay such reverence to them as I would give to a painter who despised the charm of form and colour, or to a poet who denied the power of rhythm and eloquence. Knowing well the freaks and passing whims of humanity, it would ill become me to predict the future; but, at all events, we may be thankful that we live in an age wherein the professors of any art feel bound to use language which, however poor, is at least intelligible.

For what distinguishes good art from bad art—more especially in music—is the absence of spasmodic effort, and the presence of continuity. In the symphonies of Mozart and Beethoven the themes are few, yet so treated as never to appear monotonous, and the progression from note to note and from bar to bar is so natural that we feel no other could possibly have been adopted. But in this so-called music of the future, and also in much of the present, there is a want of continuity and too much effort. We are ever in expectation, and yet ever disappointed, on finding the promise fails in the performance. The mountain labours, and out comes a mouse. But however poor the result of so much labour, the success of the mouse will be vast in comparison with its own magnitude; and, provided it is gifted with the requisite audacity, it may, for a time at least, make the face of many an established lion grow pale.

If I have not alluded to its power directly on all that comes within its reach, it is because, beginning with the fable of Orpheus, who with his lyre curbed the savage passions of unreasoning animals, history gives us facts, and fiction tells us what are as good as facts, in proof of the power of music over human passion—nor, possibly, is there any one here present who could not testify to its influence in allaying mental sorrow and soothing bodily pain, wherein music performs the sweetest part of her mission. I cannot, however, forbear giving you one little proof of the power of music in curbing a human passion, which, possibly, of all others is the least amenable to the refining influence of art—namely, cupidity. About two centuries ago there lived a musician called Stradella, whose sad history, rather than his genius, has kept him hitherto in remembrance. The composer, living in Venice, had the good or bad fortune to win the affections of a patrician's daughter, and, knowing how vain would be his poor gift of affection in the sight of pride and wealth, he took the only proper course, and ran away with his darling prize. Pride, which never can make the best of circumstances, applied its wealth for the purposes of revenge, and engaged the services of two of those gentlemen who have no scruples about the morality of their acts so long as they are well paid for their stoicism. After a long search, the fugitives were found at Milan, where Stradella had obtained the position of an organist in the cathedral. At twilight the accredited ambassadors of revenge stole into the organ-loft, where Stradella was playing in the sole presence of his wife. With daggers unsheathed they went steadily towards the entrance; and then what followed? Simply this: they were so entranced by the beauty of Stradella's music, that, in as stealthy a manner, they went away without earning their money. Other men were employed, who, years after, performed thoroughly their murderous mission. But what can we think of the two blunderers? Italians, we are told, are the children of music; but I doubt, in spite of the advance of civilisation, if two professional murderers at present would have been stopped in their work by the influence of art; and I conclude that the defaulters in the first attempt were musicians, who, though they loved money much, must have loved art more.

Ere I touch on other themes, I would yet say a few words before I unwillingly part with the tuneful Muse, in whose praise I have, however feebly, yet earnestly, spoken. In these days of tobacco-clouded and beer-perfumed halls, where the senses are continually excited by the strains of "Champagne Charlie," "Not for Joseph," and other vulgar brutalities which have obtained an equal measure of notoriety, I fear that the idea I have unfolded on the influence and power of music may be regarded as mere rhapsody; and, further, if popularity be the sign of real greatness, that my estimation of Handel, Mozart, and Beethoven is not to be tolerated. I know well that earnestness in the preacher is no proof of the truth of his doctrines; but to the public I would say this, "Do not hastily reject anything

* Read by Henry O'Neil, Esq., A.R.A., on the 21st ult., before the Society for the Encouragement of the Fine Arts.

from mere inexperience, or what is termed instinctive dislike; nor, on the other hand, accept anything merely because you are told it is thought worthy of admiration. Gain experience and then judge for yourselves." And to the musician I humbly say, "Though you may falsely accuse me of being a purist in the narrowest sense, and utterly incapable of appreciating the minor beauties of your art, yet, believe me, I do not wish to narrow the influence of any art, and gladly welcome all who seek, by however lowly means, to extend that influence. I only bid the labourers in those varied fields not to lower the character of their works to suit the taste of their audience, but, whilst exciting sympathy, to keep ever in view the duty they owe to art, nor sully the pure robes of the mistress they worship." As to those few highly-gifted beings who affect to despise music in any shape, and regard its professors as unworthy of the slightest consideration, I will content myself by answering them in Shakespeare's words :—

> The man that hath no music in himself,
> Nor is not moved with concord of sweet sounds,
> Is fit for treasons, stratagems, and spoils;
> The motions of his spirit are dull as night,
> And his affection dark as Erebus:
> Let no such man be trusted.

And Shakespeare was right. I never knew but one such man, and he was a bill discounter at sixty per cent.

Let us now turn our attention to the Drama, which in every age gives us the clearest insight into the individual character of a nation, and the moral and intellectual state of its people. On this account it does not influence, so much as it is influenced by, the prevailing taste of the day; for, considering the boundless resources at its command; the assistance it derives, more or less, from every art; and, above all, its material *personnel*—the stage at all times will be, as an entertainment, the most popular. But as its prosperity, and even its very existence, depend upon its degree of unison with the temper of the moment, change and novelty are less pernicious to its progress than they are to that of poetry, painting, and music. We may regret that Shakespeare finds in these days no appreciative audience, as, no doubt, some Athenians lamented that Æschylus and Sophocles should give way to Aristophanes; but Shakespeare will live for ever, whilst the showy meteors which during their brief existence have eclipsed the light of that fixed star will sooner or later pass away. Attempts at revivalism, moreover, can only meet with partial success—and even that will be chiefly obtained at the author's expense. When Charles Kean clothed Shakespeare in gorgeous array, though crowded audiences bore testimony to his success, he confessed that they did not come to listen to the words, but to feast their eyes on the scenery and costume. Shakespeare's influence was about as great as Byron's in the performance of "Mazeppa" at Astley's; and the attempt to make great art a mere peg whereon to display the skill of the scene-painter and the fancy of the costumier is very questionable on the score of taste.

Not that I depreciate the influence of other arts in developing the character of the play or opera to be represented, so long as such influence does not interfere with or overpower that of the poet or the musician. I have never seen anything produced on the stage so perfect in every way as was the performance of "Acis and Galatea," under Mr. Macready's management of Covent Garden, some thirty years ago. Though it is impossible to think of that performance without a grateful remembrance of Stanfield's exquisite scenery, yet the art of the painter merely assisted, but never interfered with, that of the musician; and the spectator, left with an impression which could for ever produce more pleasure on retrospection than what we now receive immediately on our return from the theatre, when what we remember most vividly are correct interiors of prisons, real pumps with real water, a real handsome cab or a locomotive, and the winner of the blue riband of the turf without the trouble of going to Epsom. Away with such realities! The purpose of the drama is to make the spectator feel how real is the performance. All such paltry attempts can only destroy the illusion of the stage, and awaken the mind to its artificial character. And though, as I have said, novelty is essential to the prosperity and existence of the stage, far fitter were it to die, if it can only live by such miserable expediences. This age—and it glories in it—is the age of appliance; but ages occur at times which are affected in other ways; and a future generation may not only wonder at the lavish expenditure bestowed on dramatic representations, but justly infer that dramatic art suffered, either from the poverty of genius in its exponents, or from the exuberance of folly in its supporters.

(*To be continued.*)

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

ON Monday evening last the annual distribution of medals and prizes took place, Sir William Tite, M.P., President, in the chair.

The minutes of the previous meeting having been read, the following Associates of the Institute were balloted for and duly elected as Fellows:—Daniel Birket, Carlisle; Lawrence Booth, Manchester; Frederic Chancellor, Old Broad-street; Alfred Darbyshire, Manchester; Geo. Gordon Hoskins, Darlington; Frederick R. Kempson, Hereford; William Peachey, Darlington; and Thomas Charles Sorby, of Brunswick-square.

Sir WILLIAM TITE said he had to announce that on Monday next, the 9th inst., there would be a special meeting of members only, to consider what proceedings should be taken by the Institute with reference to the dispute between Mr. Edward Barry and the Government. He also had great regret in announcing the deaths of Mr. J. D. Hopkins, one of the oldest members of the Institute, and of Mr. Henry Garling—both men highly respected in their day and generation.

Sir WILLIAM TITE then said that he now came to the most agreeable incident of the year connected with the Institute, viz., the presentation of the gold medal. He thought they were infinitely indebted to our gracious sovereign, for the continuance of her gracious pleasure in receiving their nominations so courteously and kindly. Of the various nominations submitted to her she had never received any name, he thought, with greater satisfaction than that of his old friend Mr Benjamin Ferrey. (Cheers.) Mr. Ferrey was a pupil not of the elder Pugin, but of the *eldest* Pugin, for there had been *three* in his (the President's) time. He well recollected that Mr. Pugin coming to the Custom House—then in course of erection by Mr. Laing, under whom he (Sir William) served his pupilage—to make some drawings, and he was (as all the Pugins seemed to be) one of the nicest draughtsmen he had ever seen. Though not so distinguished as his son, he was one of the earliest pioneers in the modern Gothic revival. He was joint author—with a Mr. Mackenzie, of one of the first books on Gothic architecture, which was published almost as early as, if not earlier than, any of Britton's great works. It was an interesting and meritorious book when books on Gothic architecture were extremely uncommon, and it deserved at the present day the warmest commendation. His (the President's) acquaintance with Mr. Ferrey began at a very early period, and he had great pleasure and gratification in announcing that he was to be the recipient of this year's royal gold medal. (Cheers.) Mr. Ferrey was, *par excellence*, the builder of churches. They all knew his great merit in that direction. He had asked Mr. Ferrey for a list of the buildings which he had carried out. He should only weary his audience by reading the list through, but he would instance a few of them. They were all aware of the great merit—the wonderful merit, in point of fact—of some of Mr. Ferrey's structures. One of the best known in London is S. Stephen's Church, Rochester-row, built at the expense of that benevolent lady Miss Burdett Coutts. He (the Chairman) thought that church quite worthy of her munificence; it was a monument of taste and elegance. (Hear, hear.) Next he would name the large church of S. James, Morpeth, and the important national work of the restoration and enlargement of the episcopal palace at Wells, and the restoration of the Chapter House and the west front of the cathedral at Wells, now going on. He hoped that Mr. Ferrey would live to see the end of that great work, which he (Sir William) thought was one of the worthiest restorations that could be undertaken at the present day. Mr. Ferrey had restored, amongst other churches, Esher Church, and the Queen, when at Claremont, had worshipped in that church, and he (the Chairman) understood on the best authority that nothing could exceed her Majesty's gratification by, and her admiration of, that very agreeable work. Coming to other buildings, he found that Mr. Ferrey had executed the Dorset County Hospital, and the Town-hall and All Saints' Church at Dorchester. He had restored and added to a castle in Ireland; restored the mansion of Sir Watkin Williams Wynn at Wynnstay, after it had been destroyed by fire; and erected a large mansion at Bulstrode for the Duke of Somerset. All these works were, Sir William thought, very creditable to the profession, but they were equally creditable to Mr. Ferrey. All that he could say was that he hoped Mr. Ferrey might long live to cultivate his great skill and talent. He had pleasure in noticing that Mr. Ferrey, like the Pugins, had the advantage of having a very skilful son (Hear, hear), and he was delighted to find that a worthy father was likely to be followed by an equally worthy son. He had great pleasure in asking Mr. Ferrey to stand forward and receive the highest testimonial the Royal Institute of British Architects could award to anyone. (Loud and prolonged cheers.) He had the pleasure of handing to him that very elegant mark of their esteem, and to record their gratification at his professional success; and he hoped that he would long live to be an ornament to the profession and to be ornamented by the medal. (Cheers.)

Mr. BENJAMIN FERREY (who was received with loud cheers) said that he could not find words to express the deep feeling he entertained of the great and unexpected honour which had just been conferred upon him. When he considered that those who had preceded him in being awarded the annual royal gold medal were men of such distinction, he felt that he was himself unworthy to receive that compliment. (No, no.) He would only say that it was to him a source of the greatest pride to receive at the hands of his professional brethren such a mark of their consideration and regard. (Cheers.)

The following prizes were then distributed by the President:—

The Soane Medallion (with the sum of £50, under certain conditions) to the author of the Design for a Metropolitan Railway Station, distinguished by the device of "A Comma within a Circle" (ERNEST C. LEE, Associate.)

The Institute Silver Medal, with £5 5s., to the author of the Drawings illustrative of Castle Rising, Norfolk, distinguished by the motto of "St. Lawrence" (EDWIN J. MUNT). In the same competition,

A Medal of Merit to the author of the drawings illustrative of Ardfert Cathedral and the Churches of Kilmetchedor and Templenahoe, Ireland, distinguished by the device of a "Square and Compasses within a Panel" (A. HILL, Associate).

The Student's Prize in Books to the author of the design for an Ornamental Ceiling, distinguished by the motto of "Truth" (R. A. CAME, student).

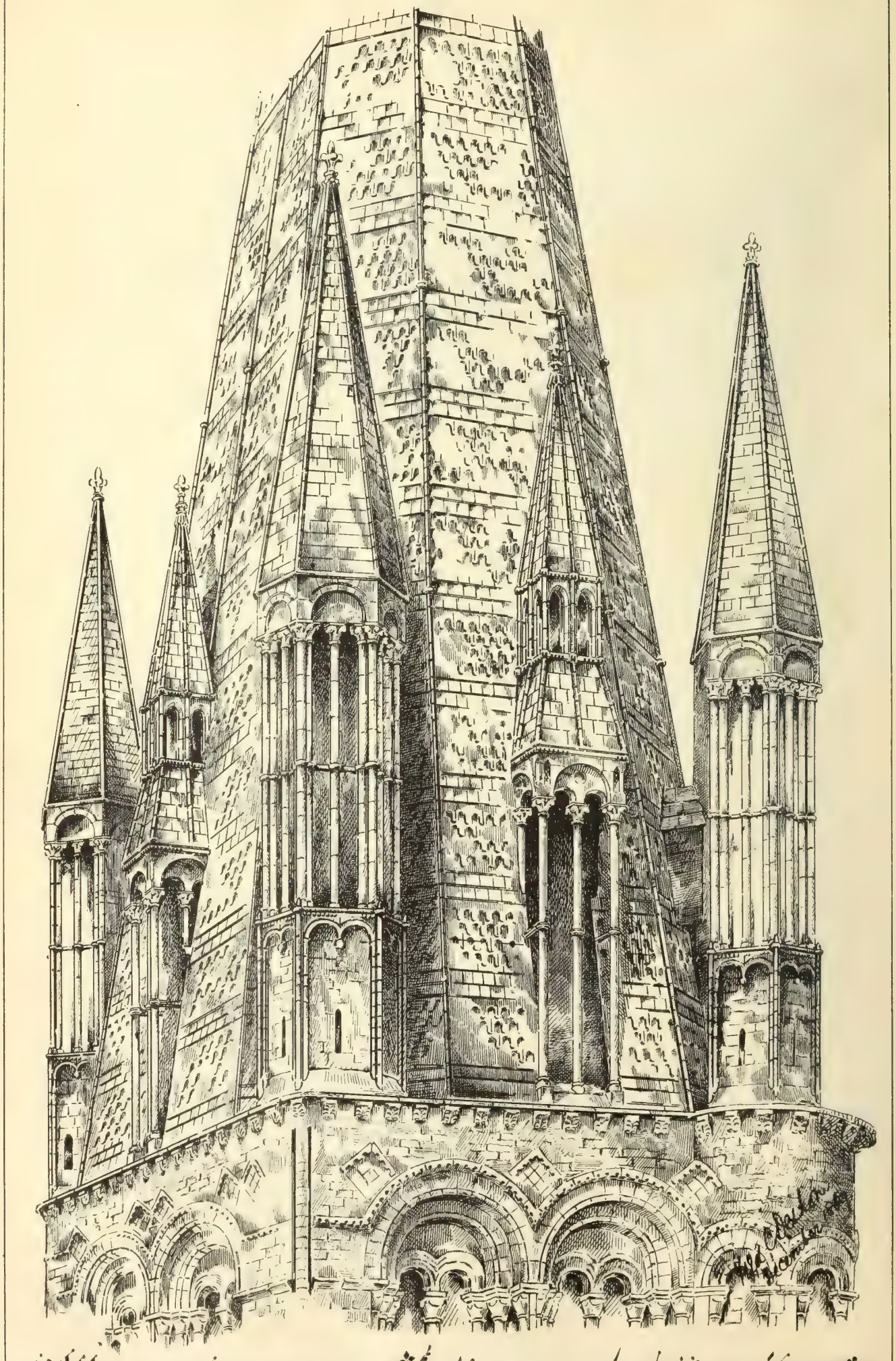
The Institute Silver Medal to the author of the essay on the "Principles of Arrangement for a Town Church," distinguished by the motto "Light, Utility, and Progress" (G. HUSKISSON GUILLAUME).

As each prize was presented Sir William Tite addressed a few words of congratulation and encouragement to the recipient. To Mr. G. H. Guillaume, the author of the essay, he remarked that he was exceedingly delighted to find the writing extremely clear and legible. No one could be more sensible of the importance of this qualification than he (the Chairman) was. The essay was an excellent one, and well adapted to the end in view.

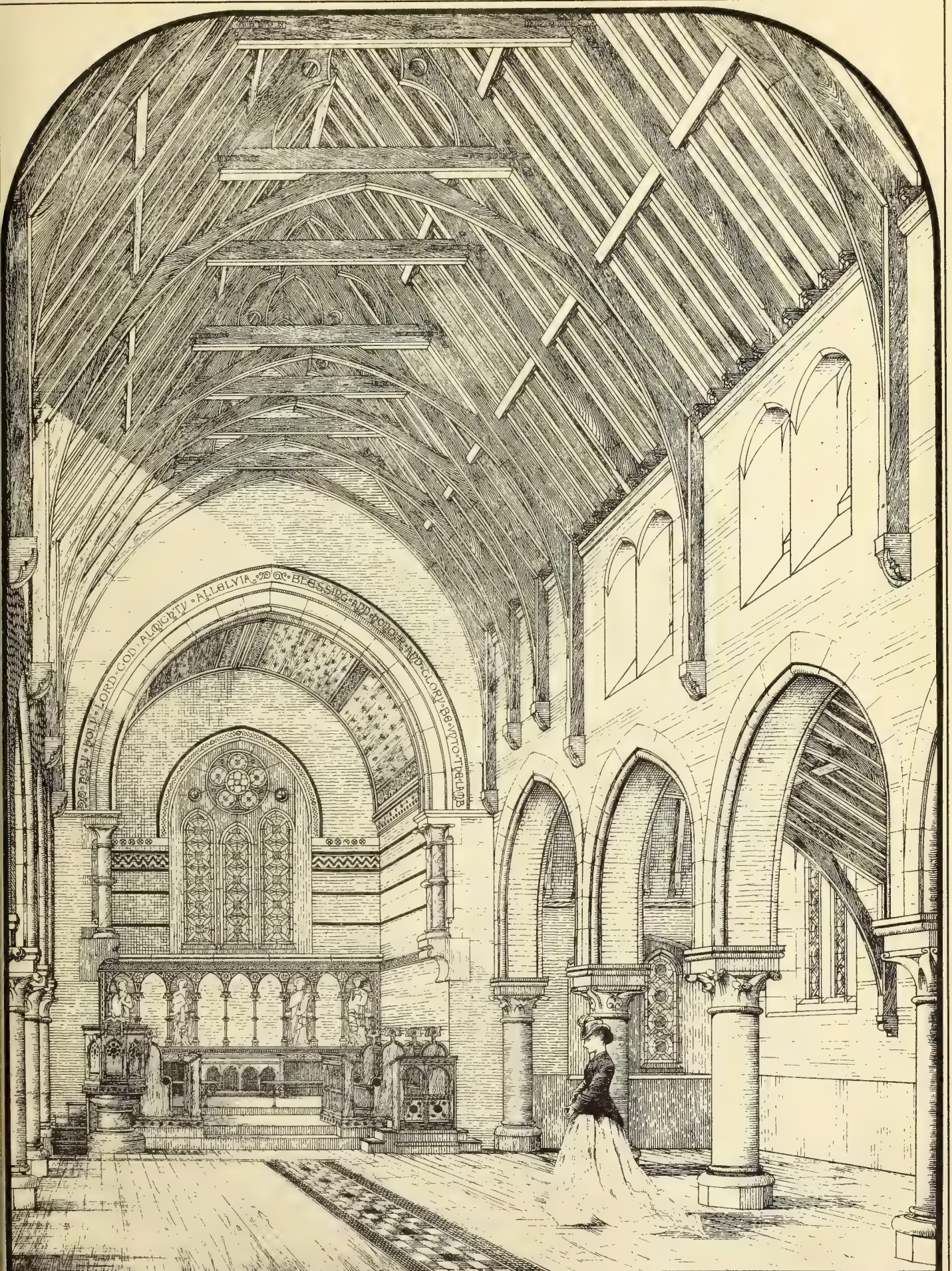
Visitors having been asked to withdraw, the annual general meeting was held, "to receive the the report of the Council on the state of the property and affairs of the Institute, together with a balance-sheet of receipts and disbursements for the year 1869; to elect the Council, honorary officers of the Institute, and the examiners under the Metropolitan Building Act for the ensuing year, and for the general dispatch of business." As our reporter was requested to retire, of course we cannot at present publish what transpired.

BUILDING NEWS SKETCH BOOK.—No. XXVII.

THE sketch given this week represents the springing of the north-west spire of the Abbaye aux Hommes, Caen. The author of the sketch has sent no description. In fact we do not know his name or address. As we have another sketch from the same author, he would oblige by sending description of sketch given this week, and the one to be given shortly.



L'Abbaye aux Hoirines Caen Springing of North West Spire



Interior View of S. SAVIOURS CHURCH, BATTERSEA. Edw. C. Robins, Esq. Architect, 16 Southampton Street, Strand.

Photo-Lithographed by Whiteman & Bass, London

G. F. ROPER, DEL.

BRIEF CHAPTERS ON BRITISH CARPENTRY.

By Thomas Morris.

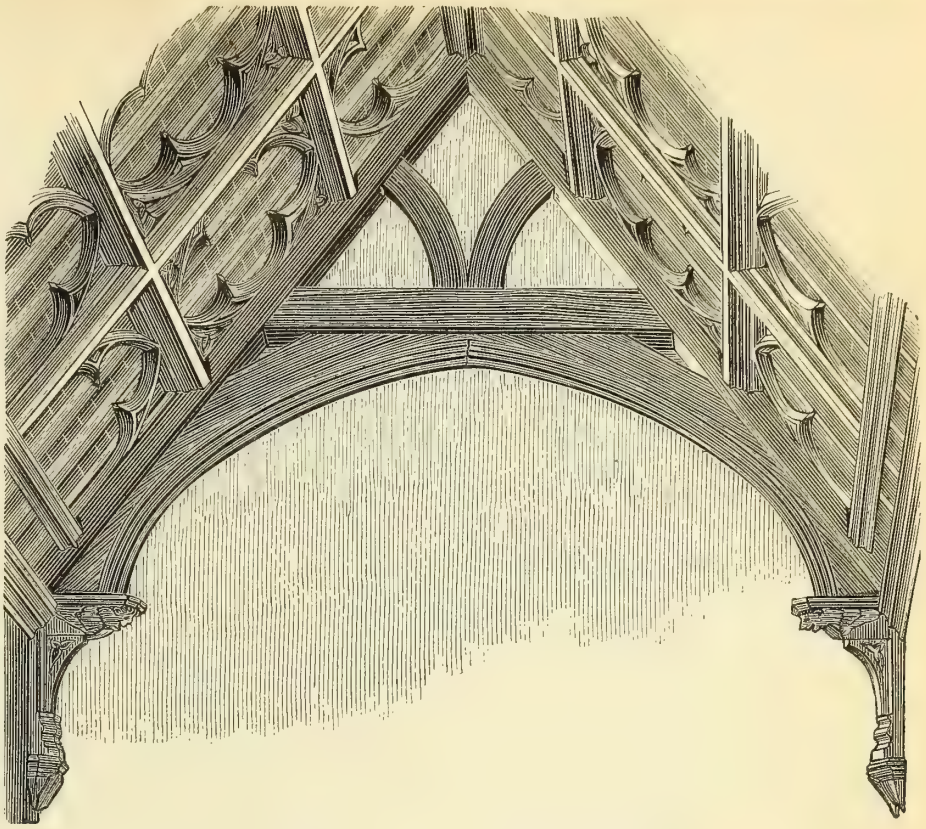
(*Continued from page* 326).

IT may not be uninteresting to notice as we pass one of the modes in which English country houses have been called into existence. In relation to them, we frequently meet with the term "manor," and so are led to an institution of probably Saxon antiquity. The king at first granted, it is assumed, to some baron or man of importance, a circuit of country for him to dwell upon, and over which to exercise such jurisdiction as was entrusted to him for maintaining the peace. He was, in return, to render stipulated services to the king. Such territories were called baronies; but this word has given way to "manors," in reference to the permanent habitation of the place by the owner and his heirs; though in these days we rather understand the incorporeal royalty or jurisdiction than the land, for one may enjoy the right and perquisites of a court-baron, while others possess the soil. When the owner of a barony parcelled the colossal tenure out to subordinate holders they became his tenants, and he remained the tenant of the king. Some manors or honours were of a chief or capital kind, having other manors under them, and then the king-tenant was called a lord paramount, and had great authority. An account of the manors existing in the reign of Edward I. was taken in 1290, and from that time, as the political or executive privileges centred in the lord, they were no longer severable, and assignable with portions of the land. Subsequent offshoots were, however, occasionally so large as practically to carry with the part, in its extent, the previous custom of the whole, but not being strictly legal, they have been designated *reputed manors*. To the barony of Anglo-Norman times there was attached the strongly fortified castle; but the *aula halla*, or *haula*, a hall, or chief mansion, was the usual appendage of the manor, and was capable also, in some cases, of great resistance to attack. Thus was brought into existence a secondary class of residences, well exemplified at South Wraxhall, near Monkton-Farley, Wilts, a few miles from Bath. The proper manor-house is not, therefore, like a modern mansion, to be copied and multiplied without limitation, since it is in necessary annexation to a demesne and court-baron. South Wraxhall was formerly part of the manor of Bradford, and included in the possessions of the richly-endowed abbey of Shaftesbury. The abbess and convent, in the 25th Edw. III. (1351-2), manumitted Thomas Scathelok their *villain*, and granted to him and Editha his wife, daughter of Roger le Porter, one messuage, and two virgates, and nine acres of land, and four acres of meadow, with appurtenances, in Lyghe and Wrokeshale, within the manor of Bradford.

South Wraxhall became in time a distinct property, and was for many generations the seat of a family named Long, a cognomen derived from the tall stature of their ancestor, and numbering in its modern ramifications Miss Catherine Tilney Long, who in 1812 married William Wellesley Pole, Esq., and he thereupon assumed the name of William Pole Tilney Long Wellesley.

Britton, in his "Beauties of Wiltshire" (1825), says:—"The mansion of South Wraxhall, a large, ancient, irregular edifice, is now occupied by the Rev. Dr. Knight, and used as a boarding school."

The founder of the edifice is supposed to be Robert Longe, a justice of the peace, who was returned to Parliament, as member for Wilts, in 1433; and he has the credit of originating one of the most complete examples of domestic architecture and house arrangement, that, size considered, remains to us of that age—an age when in the midst of state turmoil there was great popular progress. Commerce and industry advanced, and the fusion of classes that gave rise to the important body of English gentry, was perceived to be convenient and beneficial. South Wraxhall may be said to present "The Gentleman's House" of its date. There is the original portion of the Longe Howse of the time of Henry VI. There are additions of the reigns of Elizabeth and James the First, and also some modern adaptations, but the features of an ancient residence may be seen without essential change. The characteristics of the masonry afford excellent illustration of minute and careful design, and give confirming testimony to the date applied. In the perfect state of the house its windows were embellished with the vitrified histories and heraldic cognisances of its owners, and their numerous alliances, but this beautiful portion of the decorative appliances has entirely disappeared.



The Hall Roof, South Wraxhall.

The Hall, noted by Aubrey as "open and high, and windowes full of painted glasse," is in the most ancient part. It measures internally, and clear of the recesses at one end, 31ft. 8in. by 19ft. 9in. Out of this modest area a passage is to be deducted, and this reduces the length on the floor to about 25ft., so that in less space than a good dining-room of the present day is presented a perfect mediæval hall, with no room above or beneath it. The time had evidently passed when the hall was the main abode or ordinary assembling place of the entire household, and yet further removed was the period when, except "a chamber for my lord and lady, all the rest lye in common—viz., the men servants in the hall, the women in a common room." At Wraxhall there were appropriate apartments, and offices for all the requirements of the family and domestics. The hall served simply as a stately vestibule, and place of hospitable entertainment or occasional diversion. The floor was level with the ground, and the pavement probably of stone or tile. The walls rose about 20ft., and the ridge was 12ft. higher. The roof was formed in four bays with five principals, there being one next the wall at each end which is curiously sloped backwards for the purpose of relief. Each bay, being about 7ft. in width, is again divided by half principals, and there are two purlins, therefore each bay consists of six panels, surrounded by hollow mouldings in several facets; but the middle panels are the most perfect, and consist of an elongated quatrefoil in a pointed ellipse; and the angles of the rectangular panel are filled with cusped spandrels. The common rafters, 4 × 3 flatwise, are visible through these open panels; and rising above the ridge (placed diamond-wise) are framed together at the top. The chief ribs, at about half the height of the principal rafters, have the usual level strut. This timber is 11 × 9in., but the curved pieces above are not so thick. There is a well-moulded four-centred arch 7½in. thick, with no extraneous member, in the shape of label or hoodmould. These arches, set down upon carved brackets of careful design, with grotesque tops and corbel bases, upon which at a later time, have been affixed a series of shields. The massive wall plates, 12 × 6, come to the inner face, and are lined with a moulded cornice. On the side next the entrance court there is a gutter, and on the other, the tiling is carried over the thickness of the wall by auxiliary foot rafters, and ends in dripping eaves. Thus, in a roof of very moderate dimensions, is displayed a large amount of architectural character. A perfect accordance is maintained between the woodwork and the masonry; and although the latter is disturbed by the introduction of an Italianised chimney-piece, bearing the date A.D. 1598, the incongruity serves the useful purpose of proving, by a contrast of style, the correctness of the date attributed to the rest of the work. To other parts of this attractive edifice I am debarred, by want of space, from more direct allusion, but must refer to an admirably illustrated account by A. W. Pugin and T. L. Walker. London: Bohn, 1840.

In the same carefully prepared volume will be found examples of roof principals very similar to those at South Wraxhall, save in the absence of the elaborate brackets upon which the arches rest. At the Vicars College, in Wells, the arches either abut upon the walls or plates, without any terminating feature, or are rounded off, or, again, are finished with brackets of very simple form, and small projection. These are the accounted work of Thomas de Beckington, a disciple of Bishop Wykeham. While at the college in Winchester, Beckington attracted the notice of its founder, and having distinguished himself,

was sent to New College, Oxford, where he became fellow in 1408. He was tutor to Henry VI., and consecrated bishop of Bath and Wells A.D. 1443, a dignity he held till his death in 1464-5. In these last mentioned buildings there are floors and ceilings, but so far as concerns the roofs, the arch, though not in fact of much structural use, as here applied, was evidently felt to be the correct auxiliary for framed principal ribs. It is further clear that when imposts for these arches were deemed requisite, an admitted and approved form was that of the bracket or corbel.

S. SAVIOUR'S CHURCH, BATTERSEA PARK.

WE give a photo-lithograph of the interior of the above church, now in course of erection. The Rev. John McCarthy is the incumbent designate, and has for several years laboured among the poor in connection with the Mission church assembling in the infant school close by.

The church is designed in the Early French Gothic style, with nave and clerestory, north and south aisles, and chancel. The nave arcade is of stone, with simply carved capitals and moulded archivolts. Provision is made for 700 persons, including a small western nave gallery over the entrance lobbies. The staircase to the gallery is at the west end of the south aisle. At the east end of the north aisle is the organ chamber and vestry communicating with the chancel. The roofs are open timbered and ceiled between the rafters. Special trusses sustain the timber bell turret, which rises over the east end of the nave to the height of 80ft. to the top of the vane. The church is faced with Kentish rag stone and Bath stone dressings, with ornamentally disposed Bangor slating and tile ridges. The height from the ground to the ridge of the nave is 48ft. The external dimensions of the body of the church are 84ft. by 56ft., and the total length, exclusive of the buttresses, is 107ft. The cost is at the rate of £5 10s per sitting.

The architect is Mr. E. C. Robins, of Southampton-street, Strand, and the builders Messrs. Lathey Brothers. The clerk of the works is Mr. Mulley.

VALUE OF LAND IN THE CITY.—The following plots of land, situate in Queen Victoria-street, the new thoroughfare from the Poultry to Cannon-street, were disposed of on Wednesday week at the Auction Mart, in Tokenhouse-yard, Lothbury, by Messrs. Foster, of Pall Mall. The first lot offered was the plot of land on the north-east corner of Queen Victoria-street and the Poultry, with frontages to each amounting together to about 150ft., and containing a superficial area of about 2323ft. This site, from its position, being at the angle of the new street and the Poultry, is of the greatest importance, and was keenly contested. The lease of 80 years was ultimately knocked down to Mr. Wheeler, of the Poultry, at £2400 per annum. The second lot was the plot of ground adjoining westward, with a frontage to the Poultry and another to the new street. The portion next to the Poultry is in the occupation of Messrs. Wheeler and Co., and is subject to a lease of 16½ years unexpired, but possession of that portion of the plot facing the new street can be had immediately. This plot was knocked down to the same party at the price of £850 per annum. In both cases the land-tax had been redeemed by the Board of Works. The last lot was the plot of land on the south side of the street near the Mansion-house, having a superficial area of about 6296ft., with a frontage to the new street of nearly 105ft., a frontage to Charlotte-row of nearly 95ft., a frontage to Bucklersbury of about 86ft., and a circular frontage to the Poultry of about 20ft. The first offer for this important lot was £4000; the biddings then increased to £6400, at which sum it was knocked down, but not sold, being under the reserved price fixed by the Board of Works.

STIRLING SCHOOL OF ART.—The annual meeting of the members of this school was held on Friday last. The secretary read the annual report, which stated that eleven lectures had been delivered during the last session. The membership shows great decrease:—In 1866 it was 521; in 1867, 620; in 1868, 849; in 1869, 790; and in 1870, 290. The debt now stands at £64 2s. 2½d. The report was approved of, and the office-bearers were elected for the ensuing year.

Building Materials, &c.

HOT LIME AND ROUGH SAND.

SOME statements made by Mr. Parker in a lecture upon the Architecture of Ancient Rome, read lately at a meeting of the Royal Institute of Architects, seem to call for remark, the more so as they have been copied without comment in *The Church Builder* for the month of January in the present year, and thence into the pages of one of our cotemporary professional journals. On the subject of the durability of Roman walls and the cause of it, Mr. Parker remarked that, after the introduction of lime mortar, the lime in these walls was always used quite fresh and hot. Now, whatever the Romans may have done, modern science has demonstrated that the fact of the lime being hot does not affect the strength of the mortar. Experiments have shown that air-slaked lime, or lime slaked slowly, and, therefore, without any sudden ebullition of heat, by simply allowing it to absorb moisture gradually by exposing it to the air, frequently produces the strongest mortar. But it would appear that Mr. Parker has a very confused idea as to what is the meaning of "hot lime," for in explaining how the Romans managed to use their lime hot he says "the lime was used the same day that it was burnt, before it had time to absorb moisture from the atmosphere, which it does very rapidly when first burnt. This moisture makes it to begin to cool, and to expand and crystalise in the manner that lime always does when it cools." Now, *hot lime* does not mean lime hot from burning, but simply anhydrous lime; and it is so called because of the great heat generated in rich or pure limes during the process of hydration, or re-combining with a portion of the water driven off in burning, so that, instead of the moisture making it cool, it does just the reverse, causing great heat, and thereby expansion.

The further addition of the water necessary to enable the lime to pass from its state of powder into a solid mass causes no expansion whatever, provided it has been completely hydrated or slaked beforehand.

Another fallacy propounded by Mr. Parker is contained in the next few lines, which he devotes to explaining that the Romans mixed their hot lime with "rough sand, called pozzolana, ... or with pounded stone or pounded brick," and that it is due to the *roughness* of these materials that their mortar has become as hard and as durable as natural rock. Mr. Parker seems utterly unaware that the silicates of alumina, &c., contained in these *rough* sands and pounded brick played any part whatever in strengthening the Roman mortar. The lime as it sets—whether by crystallisation or otherwise—a disputed point—thereby encases but does not adhere to the particles of sand, nor does any chemical action ensue between the lime and the sand. This may be shown by applying lime to the face of a flint, which is similar in composition to a grain of sand. It does not affect its surface in the slightest degree, and the grains of sand in Roman mortar will be found on examination to have their polished surfaces perfectly uninjured. River sand or even sea sand need not therefore be avoided, as Mr. Parker suggests, on account of want of roughness, and are preferable to pit sand, inasmuch as they are cleaner and freer from loamy or other impurities. But provided the sand is clean it is immaterial whether it be pit, river, or sea sand, mixed with sea water if more convenient, as the strength of the mortar will not be affected or impaired thereby. It is unnecessary to point out to our readers that pozzolana, a volcanic product used to make lime hydraulic, is not *rough sand*.

Again, Mr. Parker calmly informs us that Portland cement is "nothing more than good lime mixed with pounded stone, and kept in *air-tight vessels* until it is wanted for use," and that the same description will apply equally to Roman cement. Now Portland cement is, in fact, nothing more than *bad* lime (chalk lime) mixed with a particular description of mud and then burnt almost to vitrifaction, ground to a powder and kept, by no means necessarily, but rather the reverse, in air-tight vessels until wanted for use. In fact, freshly-ground Portland cement should never be used until it has been exposed to the air for some little time, and Roman cement, which does need to be kept in air-tight vessels and to be used quickly and fresh, differs from Portland cement in being simply the result of burning a natural limestone already mixed with ingredients, resembling in some degree those which are artificially mixed in the manufacture of Portland cement. And the difference in character between these two cements arises from the fact that in the natural material the requisite ingredients are not found mixed in the exact proportions which scientific experiment has proved to be the best, and that other impurities are present in it which are avoided in making Portland cement, and that it cannot be subjected to the same amount of heat.

While desirous of giving Mr. Parker the credit due to him—no small amount—for his careful investigation among the antiquities of Rome, we certainly should advise him not to advance such theories as the above in the present age of scientific inquiry. He claims with some complacence to have taught the members of the Institute of Architects what they were ignorant of upon these practical points. It is, therefore, really incumbent upon one of their number to set him right as I have thus ventured to do. M. I. B. A.

NEW PUBLIC BUILDINGS.

"BRICKS and mortar" make up an important item in the national expenditure every year. In this current financial year 1870-71 building keeps its place in the estimates to be voted by the House of Commons. London takes the lead, with £32,500, a further vote on account of £195,000 for new buildings at South Kensington Museum, and £5000 towards £20,000 for the removal of the iron building to Bethnal-green; the British Museum is content with £3000 for the extension of the Elgin Gallery, exclusive of the charge for ordinary repairs. A vote of £55,000 is proposed on account of £178,000 for a new building at Burlington-house for the accommodation of various learned bodies: and a vote of £16,700, completing the £100,000 for a local habitation for the University of London. A vote this Session of £36,083 will also complete the estimated £61,000 required for the east wing of the Public Record Repository. £6395 to be now granted will complete the amount of the revised estimate of £30,840 for the restoration of the Chapter House at Westminster. There is to be a vote of £7600 for the enlargement of Marlborough House. The vote of £102,159 towards a total estimate of about double that sum for new or enlarged post-offices, and the vote of £14,350 for the purchase of sites, &c., relate both to London and the country. The proposed vote of £27,802 for new or enlarged County Courts, and £2900 for sites, is for the provinces. Scotland requires this year above £10,000 for new or improved Sheriffs' Courts; £20,000 towards £120,000 to be granted for new buildings for the University of Glasgow, and £10,000 towards an estimate of £53,335 for the extension of the Industrial Museum at Edinburgh. There is to be a vote of £7971 for fitting up apartments in Holyrood Palace for the accommodation of the Lord High Commissioner of the Church of Scotland, and for the election of representative peers. Ireland is not overlooked in forecasting the requirements of the year; there is to be a vote of £42,845 for new buildings and alterations, besides £43,232 for repairs and minor alterations of public buildings. Coastguard stations and constabulary buildings make demands for expenditure. There is to be a re-vote of £5000 towards £10,000 for a lighthouse at Bird Rocks, Bahamas; a further vote of £12,000 for a new house for Her Majesty's mission at Teheran; and £48,000 for consular buildings in China and Japan.

Building Intelligence.

CHURCHES AND CHAPELS.

Birstal.—S. Peter's Church, Birstal, near Leeds, was consecrated last week. The new edifice occupies a site where a church has stood since the eleventh century, and where there have been two, and probably three, earlier buildings. The immediate predecessor of the present church was six years ago found to be in such a dilapidated and insecure condition that an entire reconstruction was resolved upon, and the task was entrusted to Mr. W. H. Crossland, architect, of Leeds and London. Only the tower, the greater portion of which is Perpendicular in style (although the remains of earlier work are still to be distinguished), has been preserved. The chancel has been rebuilt about 18ft. further eastward, to allow the addition of a fourth bay to the nave; and the nave has been made 30ft. wider, by the addition of north and south chapels, to compensate for the loss of the galleries. In order to get a uniform level, it was found necessary to underfoot the tower. As enlarged, the church will accommodate upwards of 1000 worshippers, including 300 school children. The outer walls are all faced with dressed ashlar, which, together with the moulded and carved work, is all executed in Huddersfield stone of the finest quality. Over the entrance on the south, a niche, having a canopy with central pinnacle, has been formed for the reception of a sculptured figure of the patron saint. The seats are to be furnished with seat mats by Mr. French, of Bolton. The organ chamber and vestry, which are on the south side of the chancel, have screens, the former being of moulded oak, and the latter of ornamental ironwork and tapestry, which, together with the iron altar screen, were supplied by Messrs. Hardman and Co., of Birmingham, who also executed the stained glass in the east window. The whole of the building has been carried out by Mr. Thomas Whiteley, contractor, of Leeds. The cost of the work has been about £8700.

Blackrock.—The new church of All Saints, Newtown Park, Blackrock, Ireland, was consecrated on the 21st ult., by the Archbishop of Dublin. It is in the Early English style. The material used was granite, with dressings of sandstone. Mr. John McCurdy, C.E., was the architect; Messrs. Beckett, of South King-street, the builders. The total cost was over £3000.

Castlemacadam.—The new church of Castlemacadam, Vale of Ovoca, County Wicklow, has been consecrated by the Archbishop of Dublin. The style is Gothic. Messrs. Lanyon, Lynn, and Lanyon were the architects, and the contract was carried out by Messrs. Gahan and Sons, Harcourt-street.

Edinburgh.—A new chapel erected by the members of the United Methodist Free Church was opened on Sunday last in Park-place. It is seated for between 450 and 500 persons—150 of whom are accommodated in a small gallery at the north end of the edifice; and the cost, we believe, has been about £1200. Mr. Macrae is the architect.

Fotherby.—A new Wesleyan chapel has just been opened in the village of Fotherby, Lincolnshire. The building is described in a local paper as being "after the Composite style of architecture, the Grecian slightly predominating, built of red brick with white cornices and corner pillars." Mr. J. Thompson, of Louth, is the architect.

Hoxton.—The Jubilee Memorial Chapel of the Bible Christians, in East-road, Hoxton, has just been completed. Sittings are provided for 650 persons. There is a vestry attached, and below the chapel are a large school-room, two class-rooms, and a tea-room. Mr. H. Field is the architect, and Mr. J. C. Bishop was the builder. The total cost was about £5000.

Kirby-hill.—The ancient church of Kirby-hill, Yorks., was re-opened on Tuesday week. A short time ago, in consequence of the dilapidated condition of the church, the opinion of Mr. Gilbert Scott, R.A., was obtained. He reported that it was a most interesting church, containing Saxon work and very early Norman arches, with a beautiful Decorated arch on the side of the chancel, the walls and roof being of very good Perpendicular work. The tower is comparatively modern, though its arch is of very early date, and its foundations show evidence of the Saxon period, too well built to be pulled down. The plans of Mr. Scott were adopted, and the contract for carrying out this restoration was entered into by Messrs. Shafto and Barry, of York. The church is of the greatest antiquity, and many remains of carved crosses and other stones, evidently of Saxon origin, have been found during the progress of the works. The south porch doorway is Norman, but the remains of two former doorways besides the present one still exist, some arch-stones remaining of one, and the jamb and carved impost of another. The Norman arcade dividing the nave from north aisle has been restored, and some mural painting discovered upon the arches has been preserved. This arcade also, from the appearance of the stones, is an insertion in a Saxon wall. The north aisle has been entirely rebuilt. The whole of the seats in the church are now of oak, made from the original design, with carved poppy-head finials, and the ancient seats found in the church have been re-used. The main features of this church now present a similar appearance to what it did centuries ago, and there is accommodation for 250 worshippers.

Malborough.—The fine old parish church of Malborough, near Kingsbridge, which received the title of "The Cathedral of South Hams" from the late Bishop of Exeter, was on Tuesday week re-opened after complete and thorough restoration, at a cost of upwards of £2000. The roof is entirely new, the gallery at the western end of the church has been removed, and the tower thrown open; open benches have been substituted for the old-fashioned, unsightly pews that formerly existed. The columns and arches have been thoroughly cleaned; the old wooden windows have been removed and replaced by stone mullions; a new stained window has been placed in the eastern end of the edifice, and there is also a new reredos. The chancel is laid with Minton's tiles.

Oldham.—On Good Friday the foundation stone of a new Primitive Methodist Chapel and schools was laid at Oldham. The chapel, when completed, will accommodate 1000 persons, exclusive of the orchestra, the measurement being 29 yards in length and 17½ yards in width. The school-room will hold 1000 children. The measurement is to be 21 yards long by 13 wide. In connection with the chapel there will be a minister's vestry and a choir vestry, and in connection with the school an infant school-room, library, and seven other class-rooms. Mr. John Wild, of Oldham, is architect, and the different contracts have been let as follows:—Excavating work to Mr. John Spencer; mason work to Messrs. Heywood and Son; the brickwork to Mr. Jonathan Partington; the joiners' work to Mr. John Dodd; flagging and slating to Mr. David Jackson; the plumbing and glazing, to Messrs. Hulme, Bros.; the plastering, Mr. Robert Harris. The total amount of the tenders is £3734 18s., which, with the architect's fees, would amount to upwards of £4000.

Saltash.—The ancient chapel of Saints Nicholas and Faith, Saltash, having undergone restoration, was re-opened on Thursday week by the Bishop of Exeter. Although externally possessing few attractions, and from its general want of height being rather massive than effective, this edifice has many points of interest. It is one of the oldest churches in the district, having been consecrated by Bishop Grandisson five centuries ago, but there was a church upon the site long before that date, the whole of the south wall and a portion of the tower being decidedly Norman. Originally the church appears ts have been cruciform, the tower occupying the end of the north transept. A number of changes have, however, been made, the latest and most extensive in the Perpendicular period; and the building now consists of a nave and chancel continuous therewith; a north aisle and chancel aisle, divided therefrom by an arcade of six bays—five having granite columns; a south transept; and a low square tower in three heights, which projects somewhat into the aisle. The chapel was repaired in 1689, but thirty years ago it had become one of the most dilapidated and inconvenient places of worship in the county. Since that period the work of restoration—now practically completed—has been proceeded with at various times. Last year the work was taken in hand again, under the direction of Messrs. Ambrose and Snell, architects, Mr. Shaddock, of Saltash, being the contractor. The contract was taken at £700. The church is seated for 400 persons. The works of restoration have comprised, amongst other things, a costly reredos, carved by Mr. Harry Hems; of Exeter, it is in Bath stone and marble. A very old font, formerly belonging to Wadgworthy chapel, was given by Mr. Willcocks, of Tor. The lectern is by Mr. Stephens, of Plymouth. Altogether the outlay is not far short of £1000.

Waltham S. Lawrence.—A new church, erected as a chapel-of-ease to the parish church, was consecrated at Waltham S. Lawrence, in the diocese of Oxford, on Saturday week. Mr. J. Sharp, jun., of Waltham S. Lawrence, is the architect, and Mr. R. Lawrence, of the same village, was the builder. The entire cost of the church is £930. The style is Early English, and the plan consists of nave, chancel, apse, north and south transepts, and open wooden porch at south entrance, with a bell turret at the west end. The walls on the exterior are of red brick, slightly relieved by black bands, and in the interior of concrete block, in imitation of stone. The mullions, splays, hood-moulds, stringcourses, and corbels are all of red brick, and were moulded by the builder at his own kiln from the drawings of the architect.

BUILDINGS.

Abingdon.—The new grammar school at Abingdon was opened on Tuesday week. The new buildings have been erected by Mr. Charles Claridge, of Banbury, contractor. On the ground floor, so-called—which, however, in this case, is elevated some nine feet above the ground, in order to give an airy basement story underneath—there are a school-room 66ft. by 20ft., having an open-timbered roof, boys' library, class-rooms, dining-hall, and assistant masters' sitting-rooms. The first and second floors are devoted to dormitories and other offices. Underneath the school-room is a covered playground. The master's house is of ample dimensions, some of the rooms being much beyond the usual size, the drawing-room having an oriel window on that side which overlooks the park. Externally, the building is of a simple, substantial character, the local material of red brick and tile being the one chiefly employed, relieved by bands of Bath stone, the windows also being of that material.

Devonport.—The new S. Stephen's schools, Devonport, were formally opened on Thursday week by Lord Eliot. The site in Clowance-street was given by Sir Edward St. Aubyn, lord of the manor, and the buildings, which were commenced in August last, have been erected in accordance with plans prepared by Mr. St. Aubyn, architect, London. They will accommodate between 500 and 600 children. To both the boys' and the girls' school-rooms class-rooms are attached. Mr. W. C. Elliott was the contractor. The cost is about £1400.

Grimsby.—The foundation stone of a new Temperance Hall has been laid at Grimsby. Mr. G. Siminson is the architect, and the contractors are Mr. J. Surfleet for the brick and stone-work, and Messrs. Heywood and Coulson for the wood-work. The cost, including land, will be £3500.

Kingstown.—The ceremony of laying the first stone of the new Harbour Boat Club-house at Kingstown, Ireland, was performed on the 20th ult. by the Earl of Longford. The plans are by Mr. William Stirling, architect, Great Brunswick-street. Mr. J. Cunningham, Dalkey, has commenced the first section of the contract at £600.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

Received.—J. J. and Sons—W. F.—J. B.—W. S.—H. B. T.—T. T.—W. H. W.—Rev. W. H. G.—J. V.—L. J. W.—F. G.—U. F.—J. N.—W. B.—S. H.—S. T. D.—G. R. and Co.—E. H. H.—T. H. N.—J. H.—W. B. and Co.—G. H. G.—W. M., jun.—J. N.—G. G. F.—Q. E. F.

A Brick.—Still too much of a coward to affix your name.

P. Ault.—With sketch.

J. B. Walker.—Tracing returned.

W. T.—An architect *may* do it, but it is a surveyor's duty.

J. U. Davis.—The legality of your demand will materially depend on the instructions you received and the manner in which you followed them. Don't go to law if it can be avoided, as you are almost certain to get the worst of it. The lawyers are the chief gainers by law.

Correspondence.

WATER CISTERNS, SEWERS, DRAIN TRAPS.

(To the Editor of THE BUILDING NEWS.)

Sir,—In your number of the 29th April, there appears a notice of proceedings taken by Dr. Ballard, the Medical Officer of Health for Islington, under the heading, "Don't closely cover your water cisterns." I am not going to find fault with Dr. Ballard; on the contrary, I am exceedingly pleased to find that he so promptly ascertained what was doubtless the true cause of the outbreak of fever at the school on Highgate Hill, and took the proper measures for removing it. There is so much that is valuable contained in this extract from Dr. Ballard's report that it would be a pity if all the good derivable from it should not be obtained. I fear that this may not be the case, simply for the reason that the heading is not quite appropriate. Careless readers may skim lightly over the notice, and being more struck with the title than with the text, may conclude that if cistern covers are removed all will be well.

As you, sir, know to the contrary, the covering is a trifle—in fact, as a general rule, rather an advantage than otherwise, as keeping out, to some extent, dust and soot and other impurities.

The real evil is in the overflow pipe, which, being connected direct, is a permanent ventilator of the drains *into* the house. I am quite satisfied that this is *one* of the greatest, if not the *very* greatest defect in London house-draining arrangements. The water we drink is poisoned, the air we breathe is polluted, fever is engendered, health is destroyed, and all for want of the common sense precaution of cutting off the direct communication with the drain by means of a trap and ventilator *outside* the house. It is the easiest thing in the world to render it a physical impossibility for sewer gas to get into a dwelling house, at all events in an undiluted form, as it now regularly does.

Sanitary improvements, in the shape of public sewers, the removal of reeking cesspools, the abolition of polluted wells, &c., has done much to lower the death rate in all towns where such works have been properly carried out. In London the death-rate is not exceptionally high, but I believe it could easily be proved to demonstration that if such details as the proper ventilating and trapping of house-drains were attended to, it might be reduced at least one per thousand, and this, it is needless to say, would mean over 3000 lives saved per annum.

It is to be hoped that the Sanitary Commission now sitting will not fail to take into consideration this, one of the most important branches of the subject under their consideration.—I am, &c.,

J. MANSERGH.

3, Westminster Chambers.

"DR. ZERFFI'S NEW STYLE OF GRECIAN ARCHITECTURE."

Sir,—In answer to "P. E. M.," I beg to state that the Attic style is mentioned by Vitruvius and Pliny, Dr. Kugler, Dr. Botticher, Dr, Semper, Dr. Lubke, Dr. Krell; and it is the very climax of ignorance to call it "Dr. Zerffi's New Style of Grecian Architecture."

The list of buildings given in THE BUILDING NEWS of the 8th of April is taken, as clearly said, from Dr. Krell's work "On the History of the Doric Style."

The *general* characteristics of the Attic style given in THE BUILDING NEWS of April 22nd, are transcribed from Dr. Lubke's great work on the "History of Art," Vol. I. pp. 111-114, where specimens of the Attic and Ionic style of architecture may be studied.

As to the smiles which Dr. Lubke's description of the Attic style will raise among classical scholars of the stamp of "P. E. M." I, as well as my authority, can afford to bear them.—I am, &c.,

G. G. ZERFFI.

DRURY LANE THEATRE.

Sir,—In reply to Mr. Phipps, permit me in the first place to call his attention to the fact that I made no assertion at all, but stated "*we believe*" the work in question was done "by the scene-painters of the Gaiety Theatre." Secondly, until I read Mr. Phipps' letter I was fully under the impression that the work was actually done by them, and was ignorant of the fact that Mr. Robinson (of whom I know nothing) had been in any way employed upon the building.

Without entering into any controversy as to the quality of the gilding (which any one interested and sufficiently competent can ascertain for himself), I cannot help remarking that I think Mr. Phipps would have shown greater courtesy had he merely corrected my mistake, without accusing me of intentional misrepresentation in a matter of which he can know nothing as to the amount and sources of my information.

To the scene-painters of the Gaiety Theatre my apologies are unquestionably due.—I am, &c.,

THE WRITER OF THE ARTICLE.

Intercommunication.

QUESTIONS.

[1843.]—LAND MEASURING.—I should feel greatly obliged if any of your numerous readers would tell me the best, cheapest, and most simplified work on land measuring, and where to be obtained?—A CONSTANT READER.

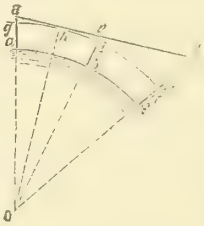
[1844.]—DRAWING.—Can either of your readers inform me when the result of the 1st Grade Drawing Examination, held at South Kensington Museum in March last, will be announced?—C.

[1845.]—BENDING VENEER.—Can any of your readers inform me by a sketch or otherwise the proper mode of forming a "curtail step" at bottom of stairs, showing the way in which the block for bending veneer is got out, and the way in which the end of the veneer is fixed into the throat of the scrool of the step, also what relation the scrool of the rail should be to the scrool of the step, and also the simplest manner of striking out a scrool?—F. H. S.

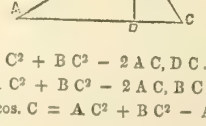
REPLIES.

[1827.]—LOCKING DRAWERS.—Having noticed the question asked by "H. R. C." in a previous number of the BUILDING NEWS, also the reply of Marcus Wicks in your last, and feeling some interest in the matter, I trust I may be pardoned for making a few remarks. In the first place, a piece of iron, say 2in. wide, liable to discoloration and rust, would be very unsightly in connection with polished mahogany drawer fronts, and if screwed on and fixed as Marcus Wicks suggests, would partially destroy the utility of the uppermost drawer, on account of its being notched, and would also when closed make it appear somewhat longer than the rest, and thus at once break up all appearance of uniformity. I should be very glad if any practical man would give (through Intercommunication column) the benefit of his experience as to the possibility of avoiding these defects, and thus confer a favour on—IGNORAMUS.

[1833.]—THE EARTH'S SPHERICITY.—The reply o "A. S. Q." to "Inquirer" is erroneous. The following is submitted as a correct reply. Let *o* be the earth's centre, and *a b c* a fluid surface at rest; then by the law of gravitation the points *a b c* are equidistant from *o*. At *a b c* (*b* being 3 and *c* 6 miles respectively from *a*), let *a d*, *b e*, *c f*, be three staves at precisely the same height above *a b c*, and let *d e l* be the line of sight directed by the nearest and centre staves, then how much is the point *l* above the furthest stave? Bisect *d e* in *h*, and with *o* *h* as radius, and *o* as centre, describe the arc *g h i k* concentric with the earth's curvature *a b c*, then the line of sight *d e l* is a tangent at *h* to the arc *g h i k*, and forms right angles *d h o*, *e h o*, with the vertical *h o*. Hence the height of the point *l* above *f* is equal to *k l* − *k f*, or *i e*, which may be found thus:—The distances *h i*, *h k*, are 1½ and 4½ miles respectively from *h*, then by the formula for the correction of the earth's curvature, $h = \frac{2}{3} d^2$, $i e = \frac{2}{3} \times h i^2 = \frac{2}{3} \times 1{\cdot}5^2 = \frac{2}{3} \times 2{\cdot}25 = 1{\cdot}5$ feet, and $k l = \frac{2}{3} \times h k^2 = \frac{2}{3} \times 4{\cdot}5^2 = \frac{2}{3} \times 20{\cdot}25 = 13{\cdot}5$ feet, and therefore the height of *l* above *f* or $k - k f = 13{\cdot}5 - 1{\cdot}5 = 12$ feet.—J. P.



[1841.]—PROBLEM.—"A Learner's" problem may be solved thus, by Euclid II., 13:—



$$A B^2 = A C^2 + B C^2 - 2 A C, D C.$$
$$= A C^2 + B C^2 - 2 A C, B C \cos. C$$
$$\therefore 2 A C, B C \cos. C = A C^2 + B C^2 - A B^2$$
$$\cos. C = \frac{A C^2 + B C^2 - A B^2}{2 A C, B C}$$
$$= \frac{3402 + 1602 - 3002}{2 \times 340 \times 160} = \frac{51200}{108800}$$
$$= \frac{8}{17} = {\cdot}47059 = \cos. 61° 56'$$

$\therefore$ C = 61° 56', and cos. C = ·47059.

Similarly,

$$\cos. A = \frac{A B^2 + A C^2 - B C^2}{2 A B, A C} = \frac{180000}{204000}$$
$$= \frac{45}{51} = {\cdot}882353 = \cos. 28° 4'$$

$\therefore$ A = 28° 4' and cos. A = ·882353.

Now

B = 180° − (A + C) = 180° − 90° = 90

$\therefore$ B = 90° and cos. B = 0

Again,

A D = A B cos. A = 300 cos. A
= 300 × 882353 = 264·7059

And

D C = B C cos. C = 160 cos. C
= 160 × ·47059 = 75·294

Also

$B D = (B C_2 - C D2)^{\frac{1}{2}} = (160^2 - 75{\cdot}2942)^{\frac{1}{2}}$
$= (19930{\cdot}813564)^{\frac{1}{2}} = 141{\cdot}176$

We have, therefore,

A D = 264·7059, C D = 75·294, B D = 141·176

Cos. A = ·882353, cos. B = 0, cos. C = ·47059.

F. H. A. H.

STAINED GLASS.

S. SAVIOUR'S CHURCH, LOWER WALMER.—Mr. W. M. Pepper has just filled the east window of S. Saviour's Church with painted glass in memory of the late Mrs. Barrow, of that parish. The window is in three lights; the subjects illustrated are in the centre the Crucifixion, and on either side the Bearing of the Cross and the Descent from the Cross; the tracery, which is very elaborate, is filled with emblems of the Evangelists surmounted by our Lord in majesty. Mr. Pepper is at present engaged in restoring the stone-work and painted glass of the east window of S. Mary's Church, Seymour-street; also in preparing nine large windows for the cathedral of Sierra-Leone.

MEMORIAL TO THE LATE VICAR OF TYNEMOUTH.—The parishioners of Tynemouth have erected a stained glass window in the tower of Christ Church to the memory of the late Rev. C. Reed, M.A., for 38 years vicar of that parish. The window is of large dimensions, being circular. The design is Our Lord's Commission to the Apostles. The figures, from their great size, are treated in a bold, effective manner. A handsome bordering surrounds the work, which is fixed in an iron frame-work. The cost of the window will be £110, which has been raised by public subscription. The artist by whom the work was executed was Mr. Baguley, of Newcastle.

PENNINGTON.—The east window of Christ Church, Pennington, has just been filled with stained glass. The window is a five-light one, and is divided into two equal portions. The upper portion of the centre light contains Our Saviour in glory, and the four remaining upper lights contain representations of the four evangelists. The five lower divisions represent as many incidents in the life of Our Saviour. The window is by Mr. Wailes, of Newcastle.

STATUES, MEMORIALS, &c.

MEMORIAL OF LORD CARLISLE.—On Monday, a memorial statue, in bronze, of the late Earl of Carlisle was unveiled in the Phœnix-park, Dublin, in the presence of the Lord Lieutenant and the Countess Spencer. The statue is the work of Mr. John Henry Foley, R.A., whose statues of Edmund Burke and Oliver Goldsmith, in front of Trinity College, established his fame in his native country. The figure of Lord Carlisle is about 8ft. 3in. in height, and stands on a pedestal of nearly the same elevation. He wears the robes of Grand Master of the Order of S. Patrick, with the badge; the Garter, the ribbon of the order, and the George. The robes are thrown back so as to display the entire front of the figure, which leans slightly to the right, the left arm resting on the hip, the right hand supported on a book. The pedestal is of Wicklow granite.

WATER SUPPLY AND SANITARY MATTERS.

THE METROPOLITAN SEWAGE.—The Native Guano Company have proposed to the Board of Works to utilise their sewage both at Crossness and Barking, and in proof of their ability to do this, offer to place their works at Hastings and Leamington under a competent committee of inspection, and to defray the expense of examination.

THE AQUEDUCT OVER THE RIVER AIRE.—An important work has been completed near Hirst Mill, on the River Aire, under the direction of Mr. Gott, C E, Engineer for the Bradford Waterworks. The water from the Barden district has been conveyed in iron pipes, 30in diameter, under the bed of the Aire, but the fact that there was only one pipe for the supply, which might at any time be disarranged, and so cut off in a moment the principal water service for Bradford, induced the Corporation to project an aqueduct over the river, so that if one pipe failed, another could be used, and all risk avoided. The works for this purpose have been in progress some time, and are now finished in a substantial manner. The river is spanned by an iron bridge, 6ft. square, composed of wrought plates, bolted together, resting on stone piers, which carry the pipes, twelve in number, 30in. in diameter, and each about two tons weight. The pipes rest on iron sockets and the top of the bridge is left open at intervals, enabling each pipe to be taken out and repaired without interfering with the construction of the bridge, the latter having a span of 106ft, and being 12ft. above the ordinary level of the river. From the bridge the pipes are laid down an inclined plane on either side of the stream until a junction is effected with the mains from Barden and to Bradford, the landwork being completed with masonry, 180ft. in length on the north side, and 120ft. on the south side of the Aire. At the lower ends of the inclines are round valve houses, 16ft. diameter and 15ft. 6in. in height, finished with domed tops,

having a radius of 9ft. 6in., containing the valves, four in number, by which the flow of water is regulated. There are two valves on either side, readily worked, and the supply can be turned either into the aqueduct pipe or into that laid in the bed of the Aire, and thus a regular service is secured. The stonework has been executed by Messrs. A. Bailey, Sons, and Co., of Cross Roads near Keighley; and the ironwork by Messrs. Butler and Pitts, of Stanningley, the pipes being furnished by the Corporation. The work throughout has been performed in a creditable manner, under the superintendence of Mr. J. Hardwick, of the waterworks department.

WEST HAM.—The Sewage Committee of the West Ham Local Board of Health is now engaged in experiments to determine the best mode of utilising sewage.

S. LUKE'S.—At the last meeting of the S. Luke's Vestry, a report from the medical officer of health was read, condemning houses in China-yard, Golden-lane, Turk's-head-court, S. John's-place, and several other localities situate in Golden-lane, as being unfit for human habitation. The matter was referred to the surveyor to report as to whether or not structural alterations would be sufficient to remedy the evil.

Our Office Table.

INCREASE IN VALUE OF LAND IN THE SUBURBS.—About two and a half acres of land at Stoke Newington, with a frontage to Albion-road, were on Tuesday sold by auction at the Mart, by Messrs. Debenham, Tewson, and Farmer, and realised an average price of £2200 per acre. It was understood that the property was purchased by the late proprietor during the present century at about £100 an acre.

INSTITUTION OF SURVEYORS.—At the Ordinary General Meeting held on Monday, April 25, the following names were read and passed, to be balloted for on May 23rd, viz.:—As Associates; John George Hollway, Lamb-building, Temple; Edward Rushworth Keele, 5, Frederick's-place, Old Jewry. The following donations to the library were announced:—"R. Mudie's History of Hampshire," three volumes, by J. Wigram. "Sir H. Chauncy's History and Antiquities of Hertfordshire," two volumes, by J. Crawter. "Viscount Torrington's Treatise on Farm Buildings and the State of Agriculture," by S. J. Herrtage. "T. F. Hedley's Letters on Rating Coal Mines," by the Author. The following donations to the Library Fund were announced:—W. Lovejoy, £3 3s.; C. A. Macaulay, £3 3s.; J.S. Ellis, £2 2s. A vote of thanks was unanimously passed to the various donors.

OPENING OF THE TRAMWAY FROM BRIXTON TO KENNINGTON-PARK.—On Monday morning the Metropolitan Tramway Company opened their line from the Brixton Railway-station to the Horns, for public traffic. The cars are very commodious, and the seats are fitted with velvet cushions and backs. The windows are provided with sun-blinds. There are seats for twenty-two persons inside and twenty-four outside, besides the standing room on the platform, which seems a favourite place with passengers. The carriages are built by Messrs. Starbuck, of Birkenhead. Access to the roof is gained by a winding ladder; the seats to which it leads are made like garden seats. The cars commenced running soon after eight o'clock, and considering that no public notification had been made, they were well filled. They are each drawn by two horses, and it may be remarked that better cattle are not to be seen on any London road. The first car was driven by one of the directors, and some other directors and Mr. Hopkins, the engineer of the line, were also present. The wheels of the cars run in a groove in an iron rail, and the absence of friction gives an ease of motion of which the ordinary omnibus gives no idea. By means of a brake the cars can be stopped easily in their own length. The horses' bridles are provided with bells, the jingle of which gives notice to other vehicles to get out of the way. The fare is 2d., paid on entering, and a ticket with a number corresponding to the counterfoil is given as a receipt. The same company have broken ground in Clapham for a line to form a junction with the present at the Horns, and thence to be extended to Westminster. Mr. Scott has the management of the line. During experimental trials, many members of Parliament and others were present.

ROMAN REMAINS AT BATH.—The excavations that are being made at Bath for the construction of the new Pump Room Hotel have brought to light some very interesting Roman remains. The most valuable results are the determination of the south and west limits of the great temple, and the discovery of some ornamental stonework so similar in details to that which appears upon the temple of Jupiter Stator at Rome as to suggest the probable date of the Bath Temple. The plan of the forum and the course of its surrounding ways may now be traced with sufficient accuracy to enable the antiquary to construct a tolerably perfect plan of Aquæ Solis, at the time when it was the grand watering-place of Roman Britain. A great many fragments of flat sheets of Roman glass have been found, which bear all the appearance of having been rolled or cast.

ARCHITECTS' PLANS.—A dispute appears to have occurred between the Islington Guardians and their architect, Mr. Burden, as to the possession of the plans of the new Islington workhouse. The plans are at present detained by the Guardians, but at a meeting of the Board on Friday week the Clerk read a letter from Mr. Burden, asking that the working plans, detained by the Guardians on the advice of their legal advisers, should be given up to him, or that he should be allowed to take tracings of them at the cost of the Guardians. After some discussion, it was decided to write to Mr. Burden, asking him if he could not make the plans in the possession of Mr. Lewis, the Clerk of the Works, answer his purpose for the present.

PARKS FOR PROVINCIAL TOWNS.—There is a prospect of Bradford becoming possessed of another public park. Mr. C. S. Lister has offered his estate at Manningham to the Corporation for public purposes for £60,000, about £11,000 less than its value. He will also subscribe £20,000 towards the purchase-money, and he will allow the Corporation to sell some fourteen acres, on which villas may be erected. Warrington appears to be less fortunate. The *Warrington Guardian* states that Colonel Patten has withdrawn his gift of a park to that town in consequence of the parsimonious conduct of the Town Council at their last meeting.

Chips.

The foundation stone of a new Methodist Church at Dromore was laid on the 28th ult. The architect is Mr. William Gray, Belfast; the builder is Mr. Adam George, of Holywood, The cost will be about £800.

It is understood that the present Chief Commissioner of Works has decided not only not to continue the iron railings, upon which there has been so much controversy, round the Regent's Park, but has determined on the restoration of the former palings where they have been displaced, so as to continue to sustain the rural character of the park enclosure.

On Monday week the foundation stone of a new church, from the designs of Mr. John Scott, was laid at Hythe.

The Metropolitan Board of Works has approved the application of the S. Saviour's District Board of Works for permission to contract a loan of two thousand pounds, to meet expenses for making improvements on Blackfriars-road.

Longdon Church, near Tewkesbury, was re-opened on Friday, the Rev. A. C. Lefroy, vicar, having acted as architect in the expenditure of £700 in its restoration. Over the altar is an almost life-size picture of the Crucifixion, by the late curate, the Rev. W. Calvert, now vicar of S. John's, Kentish-town, London.

Mr. Blaauw, F.S.A., of Beechland, Sussex, died last week at the age of 76; he was a most accomplished and learned antiquary, and one of the founders of the Sussex Archæological Society.

Old-street, S. Luke's, and other streets in the parish, are now being re-paved, at a cost to the vestry of £14,847. Messrs. Sewell and Son are the contractors.

A large joss or idol, sent home from China by Admiral Keppel, as a present for the Prince of Wales, has arrived at Sandringham. The figure weighs about 30cwt., and is of metal. It is not of great height, but it is of massive proportions.

The Cabinet Theatre, King's-cross, has just been re-decorated by Messrs. A. and A. Baldwin, of Tottenham-court-road.

Dr. G. G. Zerffi, invited by the Committee of the the "Society for the Encouragement of Home Study," will deliver a lecture on the "Development of Art," after the distribution of the annual prizes to the successful candidates on Friday next, the 13th of May, at the Hall of the Queen-street School of Art.

The White Bear Yard, Piccadilly, and some of the adjoining property, have been purchased by Messrs. Spiers and Pond, who intend erecting a gigantic restaurant on the site. The bar will be the largest in the world, and the building will comprise, in addition to the refreshment department, a large concert hall and banqueting-room. The works will shortly be commenced.

Timber Trade Review.

THE TIMBER MERCHANTS AND THE NEW BUILDING ACT.

A LARGE and highly influential meeting, convened by circular, was held on Friday last at the Surrey Commercial Dock offices, Fenchurch-street, to organise an opposition to a Bill before Parliament "for consolidating and amending the Building Acts relating to the metropolis." Mr. Peter Rolt, who was called to the chair, said if the 111th clause of the Bill passed, the wood trade of the east and west of London would be annihilated, and it was, therefore, the duty of the trade to press the Government to withdraw the Bill. Mr. J. Sims (Churchill and Sims) would not go the length of saying the trade would be destroyed, but if it were desired to drive the trade from London, this Bill was the very thing to do it. It was their own tinkering notions of local affairs that induced the Metropolitan Board of Works, the real promoters of the Bill, to meddle with large interests. They might, perhaps, make the streets prettier, or more regular in aspect by their building crotchets, but this result would be dearly bought if it was to involve the removal of a flourishing trade from our midst, and the destruction of large properties. Mr. Taggart said the dock companies were also opposed to the Bill on other grounds, and the Government, or those who had charge of the Bill, must be pressed to refer it to a Select Committee, where all parties could be heard. Its injustice and impolicy, however, did not admit of a moment's doubt. Ultimately the following resolutions were carried unanimously, the movers and seconders being Messrs. Churchill, Hunter, Taggart, Dyer, Gabriel (T. Gabriel and Sons), and Johnson—viz., 1. That in the opinion of this meeting the passing of the Bill will injuriously affect the interest of timber merchants, builders, carpenters, cabinet-makers, saw-mill proprietors, and all others engaged in the sale or manufacture of wood. 2. That should this Bill pass as it now stands, it would be impossible for many of these trades, which give employment to large numbers of the working classes, to continue in their present localities; by which means the existing distress, especially at the East-end, would be considerably aggravated. 3. That a committee be appointed to prepare and sign on behalf of this meeting a petition to Parliament against the passing of the Bill.

The following are the average quotations during the past week at the following ports:—

LIVERPOOL.

		£	s		£	s
Dantzic Deals	Petersburg standard	8	0	to	9	0
Swedish redwood		7	10	„	8	0
Petersburg ditto		8	10	„	11	0
American pine		9	0	„	10	10
„ spruce		6	10	„	6	15
New Brunswick and Nova Scotia spruce		7	0	„	7	10
„ „ pine		7	10	„	9	0
Dantzic lathwood (4ft.)	per fathom	4	10	„	5	0
British American do.		3	0	„	5	10
Jamaica logwood	per ton	4	7	„	5	0
St. Domingo do.		4	10	„	4	15
Honduras do.		7	0	„	7	10
Sampeachy do.		10	0	„	10	10
Tobasco do.		8	0	„	9	0
Nicaragua wood (solid)		12	0	„	12	10
Do., small		5	0	„	7	0
Lima wood		11	0	„	13	0
Barwood		4	10			
Camwood		15	0	„	25	0

BRISTOL.

		£	s.		£	s.
Archangel, 1st redwood	per Petg. std.	14	10			
Do. 2nd „		10	5			
Onega 1st „		15	0	to	15	5
Do. 2nd „		10	10	„	11	0
Swedish deals „		9	0	„	10	0
„ Battens „		8	10	„	9	10
Quebec, 1st bright pine		18	10	„	19	0
Do. „ floated do.		17	10	„	18	0
Do. 2nd bright do.		13	0	„	13	5
Do. „ floated do.		12	5	„	12	10
Do. 3rd bright ditto		9	0	„	9	10
Do. „ floated do.		8	0	„	8	10
		s.	d.		s.	d.
Dram 1st, 1 × 6½ redwood flooring boards	per square	10	6	„	11	0
Do. 1 × 6½ and 7in. do.		9	6	„	10	0
Gothenburg, 1st and 2nd mixed, 1¼ × 7, do.		15	0	„	16	6
Dram, 1st white, 1 × 6½ and 7, do.		9	0	„	10	0
Do., do., ⅞ × 7, do.		8	6	„	9	0
Swedish timber	per load	47	6	„	55	0
Memel, 2nd do.		57	6	„	60	0
Quebec board, yellow pine		87	6	„	90	0
Ditto for ordinary use		60	0	„	62	6

HULL.

		£	s.		£	s.
Onega, 1st redwood	Petg. std.	13	10	„	14	0
Petersburgh, 1st do.		12	10	„	13	0
Do., do. whitewood		9	10	„	9	15

	£ s.		£ s.
Wyburg redwood	9 10	to	9 15
Memel, 2nd do.	8 15	,,	9 0
Riga crown whitewood	8 0		
Quebec best pine (fair average)	18 0	,,	18 5
Holmsund, 1st and 2nd mixed redwood	9 10	,,	10 0
Do., 3rd do.	7 10		
Uleaborg, do.	7 10	,,	8 0
Memel, crown pipe staves ..... per mille	140 0	,,	150 0
	s. d.		s. d
Memel, crown timber	80 0	,,	82 6
Do., best do.	70 0	,,	75 0
Do., second do.	55 0	,,	60 0
Dantzic, second do.	52 6	,,	55 0
Sundswall, do.	42 6	,,	45 0
Quebec, yellow pine do.	85 0	,,	90 0
,, oak do.	120 0	,,	125 0
,, elm do.	107 6	,,	110 0
,, birch do.	85 0	,,	90 0
Memel, wainscot logs ..... per foot cube	5 0		

HARTLEPOOL, SUNDERLAND, WHITBY, &c.

There being little variation at the above ports, a fair average is given.

	£ s.		£ s.
Archangel, 1st redwood ..... Petg. std.	12 5	,,	12 10
Swartwick, 1st and 2nd mixed do.	8 0	,,	9 10
Do., 3rd do.	7 10	,,	7 15
Riga, crown, whitewood	9 0	,,	9 5
Uleaborg, redwood	7 15	,,	8 5
Wyburg, do.	9 10	,,	9 15
Memel, 2nd do.	9 0	,,	9 5
Onego, 1st do.	14 0	,,	14 5
Petersburgh, 1st do.	12 10	,,	13 0
Ditto, 1st whitewood	9 0	,,	9 10
Quebec, 1st pine	18 0	,,	18 10
Memel, crown pipe staves ..... per mille	145 0	,,	150 0
	s. d.		s. d.
Swedish timber ..... per load	45 0	,,	50 0
Memel, crown do.	80 0	,,	85 0
,, best do.	72 6	,,	75 0
,, ditto second do.	55 0	,,	60 0
Quebec, yellow pine	75 0	,,	90 0
,, do. small	60 0	,,	70 0
,, oak	115 0	,,	125 0
,, elm	110 0	,,	112 6
,, birch	85 0	,,	92 6
Memel, wainscot logs ..... per foot cube	5 0	,,	5 3

SOUTHAMPTON.

	£ s.		£ s.
Holmsund, 1st and 2nd mixed redwood, Petg. std.	11 10		
Do., 3rd do.	10 5		
Gothenburg, 1st and 2nd mixed	11 10	,,	11 15
Do., 3rd do.	10 10	,,	10 15
Quebec, 1st pine deals	21 0	,,	22 10
Do., 2nd do	16 0	,,	16 5
	s. d.		
Sundswall timber ..... per load	50 0		
Scaffold poles ..... per foot run	0 1¾		
Rickers, 22ft.	2s. 9d. each.		
Good redwood, 2½ × 7, for building purposes, from 1½d. per foot run			
Do., 3 × 11, do., from 2¾d.			

The following quotations of the prices of building materials at Hobart Town and Sydney may also prove interesting.

PRICES OF BUILDING MATERIALS AT HOBART TOWN.

	£ s.		£ s.
Duchess slates ..... per 1000	16 0	to	18 0
Countess do.	13 0	,,	14 0
Viscountess do.	10 0	,,	12 0
Ladies do.	6 10	,,	8 0
Galvanised cor. iron, from 24in. ..... per ton	27 15		
Do., do., 28in.	31 10		
Colonial bricks ..... per 1000	1 15	,,	2 0
Do. fire	8 0		
Battens ..... per 100ft.	5s. to 6s. 6d.		
Deals, 3 × 9	6d.		
Do., 3 × 11	7d.		

From Sydney there are the following quotations:—

Cement	per barrel 14s. 6d. to 15s. 6d.
Slates	per 1000 £11 10s. to £12 10s.
American lumber	per 100ft. super 25s. 6d. to 26s.
Shelving	17s. 6d. to 19s.
Pitch pine flooring	19s. 0d.

Messrs. Churchill and Sim have a sale at the Baltic, Threadneedle-street, on Wednesday 11th inst., and Messrs. Simson and Mason at the same place, on Wednesday, 18th inst.

Rattening in Lancashire.—In consequence of Mr. Johnson, builder, Manchester, and Secretary to the Master Builders' Association, employing machinery in making bricks, his timber yard was set fire to on Saturday night last, and an attempt at the same time was made to blow up his house at Levenshulme by throwing an infernal machine at his drawing-room window. Considering that the quality of hand-made bricks has been falling off of late years, it is high time that machinery was more generally introduced. The bricks used in the construction of the Metropolitan District Railway were principally made on the works, and by machinery. As many as half a million could be drawn per week from the two kilns, and much more work could have been done if necessary, and the quality and manufacture were far superior to handmade bricks.

Pembroke Dockyard.—The sale of timber at Pembroke Dock, by direction of the Lords of the Admiralty, realised about £7000. The timber sold consisted of surplus stores of English, Italian, and African oak, teak, sabicu, greenheart, and mora; Spanish, Mexican, and Honduras mahogany, pine, fir, elm, &c., all of which were in log, plank, and board; 530 lots were catalogued, but the whole were not sold, there being no offers for some of the greenheart and mahogany. This is the first sale of the kind held at Pembroke, and fair prices were obtained.

Sale by Auction, 3rd May, of 20,000 walnut and mahogany veneers at No. 62, Curtain-road.

This being a bankrupt's stock, there was no reserve, and some of the lots hardly realised the cost of sawing. The catalogue seldom specifies the length and width, but this deficiency has been supplied, quite near enough for the reader to form a correct judgment. It will be observed that some were sold by the lot, others at a price for each veneer, &c.

About 2 to 2½ft. average length, and 14in. to 16in. wide.

197	Pieces	Walnut burr veneers	24s. per lot.
225	,,	,,	17s. ,,
246	,,	,,	19s. ,,
147	,,	,,	11s. ,,
209	,,	,,	30s. ,,
194	,,	,,	12s. ,,
201	,,	,,	21s. ,,
189	,,	,,	12s. ,,
228	,,	,,	13s. ,,
191	,,	,,	25s. ,,
215	,,	,,	33s. ,,
195	,,	,,	21s. ,,
180	,,	,,	25s. ,,
197	,,	,,	31s. ,,
200	,,	,,	22s. ,,
162	,,	,,	25s. ,,
193	,,	,,	34s. ,,
188	,,	,,	37s. ,,
209	,,	,,	21s. ,,
183	,,	,,	18s. ,,
186	,,	,,	10s. ,,
150	,,	,,	25s. ,,
155	,,	,,	38s. ,,

Trunk walnut veneers, 48 × 18, 1¾d. to 2½d. super.

Do., 48 × 16, 2¾d. to 3d.

Walnut veneers about 3 to 3½ft., 12 to 15in. wide, 2d. to 3¾d. each.

Do., do., above 15in., 4½d. to 6¾d. each.

Figured walnut veneers, about 4ft. long and 24in. wide, 5¼d. to 5¾d. each.

Do., smaller sizes, 2½d. to 3d. each.

Ebonised veneers, 2d. to 4½d. each.

Walnut veneers, 6ft. 4in. by 1 ft. 8in., 5¼d. each.

Do., do. (superior) 6¼d. each.

Wainscot veneer, knife cut, about 5ft. long by 14in. wide, 1d. to 1¾d. each.

Good figured mahogany veneers about 8ft. long and 16in. wide, from ¾d. to 2d. each, and 6s. to 10s. per 100ft. run.

Spanish curls, about 2½ft. long and 14in. wide, 2½d. to 3d. each.

Do., about 1 to 2ft. long and 14in. wide, 1¾d. each.

Do., about 2ft. long and 12in. wide, 2¾d. each.

Do., about 3ft. long and 14in. wide, 3¼d. each.

The lots, from lot 92 to the end of the catalogue, consisting of short lengths of walnut burr veneer, sold from 2d. to 7d. each. They were about 2 to 3ft. long and from 15 to 24ins. wide. The latter price was, however, given for an exceptionally fine parcel. Altogether it was as favourable a sale for buyers as could be desired, and without being at all of unusually good quality, the goods offered were well seasoned and generally fit for use for ordinary purposes.

LATEST PRICES OF MATERIALS USED IN CONSTRUCTION.

TIMBER.

	£ s.	£ s.
Teak ..... load	12 0	12 10
Quebec, red pine	3 15	4 15
,, yellow pine..	4 0	5 0
St. John, N.B. yellow	0 0	0 0
Quebec oak	5 15	6 5
,, birch	3 15	4 15
,, elm	4 5	5 5
Dantzic oak	4 5	6 5
,, fir	2 5	4 5
Memel fir	2 5	3 10
Riga	2 15	3 5
Swedish	2 0	2 13
Masts, Queb. red pine	3 10	6 0
,, yellow pine ..	4 5	6 0
Lathwood, Dant. fm.	4 0	6 0
,, St P'burg.	6 0	6 10
Deals, pr C., 12ft by 3 by 9 in.		
Quebec, white spruce	12 10	17 10
St. John, white spruce	12 10	15 0
Yellow pine, per reduced C.		
Canada, 1st quality..	18 0	19 0
2nd do.....	12 0	13 0
Archangel, yellow ..	11 0	12 10
St. Petersburg, yel...	11 0	12 0
Finland	6 10	8 0
Memel	7 0	9 0
Gothenburg, yellow	8 0	8 10
,, white ..	0 0	0 0
Gefle, yellow	9 0	10 10
Soderham	8 0	9 10
Christiania, per C., 12 ft. by 3 by 9 in yellow	10 0	12 10
Flooring Boards, per sq. of 1in., first yel.	7 6	10 0
First white	7 0	9 6
Second qualities	6 0	7 0
PUMICE STONE pr tn	6 0	8 0
OILS, &c.		
Seal, pale .. per tun	42 10	0 0
Sperm body	91 0	93 0
Cod	41 0	0 0
Whale, Sth Sea, pale	38 0	39 0
Olive, Gallipoli.....	56 0	0 0
Cocoanut, Cochin, tun	45 0	46 0
Palm, fine	40 0	0 0
Linseed	32 0	0 0
Rapeseed, Eng. pale..	45 0	45 10
Cottonseed	31 0	36 0

METALS.

LEAD:—

Pig, Foreign	per ton	18	0 0	18	2	6
,, English, W.B.	do.	19	5 0	19	7	6
,, Lead Co.	do.	18	7 6	19	0	0
,, Other brands	do.	18	7 6	18	12	6
Sheet Milled	do.	19	5 0	19	10	0
Shot, Patent	do.	22	0 0	0	0	0
Red or minium	do.	20	0 0	0	0	0
Litharge, WB	do.	0	0 0	0	0	0
White dry	do.	26	0 0	28	0	0
,, ground in oil	do.	26	0 0	29	0	0

COPPER:—

British—cake and ingot	per ton	70	10 0	71	0	0
Best Selected	do.	72	0 0	0	0	0
Sheet	do.	75	0 0	0	0	0
Bottoms	do.	78	0 0	0	0	0
Australian	do.	73	0 0	75	0	0
Spanish Cake	cash	0	0 0	0	0	0
Chili Bars	,,	67	0 0	68	0	0
" refined ingot		71	0 0	74	0	0
Yel. Metal Sheathing & Rods	per lb.	0	0 6¾	0	0	6¾

MEETINGS FOR THE ENSUING WEEK.

Monday.—Institution of Surveyors. Discussion on Mr. Ryde's paper "On Parochial Assessments." 8.

Tuesday.—Institution of Civil Engineers. 1st Discussion, on the strength of Iron and Steel; 2nd, Recent Improvements in Regenerative Hot Blast Stoves for Blast Furnaces, by E. A. Cowper, M.Inst. C.E. 8.

,, Royal Institution. On the Principles of Moral and Political Philosophy, by Prof. Blackie. 3.

Wednesday.—Society of Arts. On Railways for India, by W. P. Andrew, Esq. 8.

,, Geological Society. 8.

Thursday.—Royal Institution. Lecture by Prof. Tyndall, LL.D., F.R.S. 3.

,, Society of Antiquaries. 8.30.

Friday.—Royal Institution. 9.

Saturday.—Associated Arts Institute. Exhibition of Sketches. Discussion—Thesis, That the present prospects of European Art are satisfactory. 8.15.

,, Royal Institution. On Astronomy, by Prof. R. Grant, LL.D. F.R.S. 3.

Trade News.

TENDERS.

Brighton.—For public baths, &c., North-road, Brighton. P. C. Lockwood, Esq., C.E. Quantities by J. C. Lansdowne:—

Builder's Work.

Lockyer	£1060
Nightingale	943
Richardson	942
Cheeseman	940
Blackmore	920

Engineer's Work.

Woollett	£950
Mills and Wellman	755
Busby	724
Whitmore and Bunyon	722
Jennings	720
Jeakes and Co.	657
Reed	575

Datchet.—For additions and alterations to Sandlea House, Datchet. Mr. Josiah Houle, architect. Quantities by Mr. D. Cubitt Nichols:—

Ashby and Son	£5994
I'Anson	5932
Mansfield and Price	5793
Axford and Whillier	5698
Patman and Fotheringham	5595
Macey	5592

Highgate.—For Ken Wood Tower, Highgate, for E. Brooke, Esq., Messrs. Salomons and Jones, architects, 21, Whitehall-place. The foundations having been put in by Messrs. Sharpington and Cole. Quantities by Mr. Bagg, 21, Whitehall-place.

Bird	£11,491
Lawrence and Sons	11,430
Fish	11,100
Sharpington and Cole	10,777
Manley and Rogers	10,711
Dove Brothers	10,675
Myers and Sons	10,652
Jackson and Shaw (accepted)	10,167

Kensington.—For the erection of All Souls church, Kensington-park. Mr. James Edmeston and Mr. J. S. Edmeston, architects:—

Cowland, exclusive of fittings and upper part of tower (accepted)	£4300

Leavesden.—For engine, boilers, pump, &c., at the Leavesden schools:—

Lees and Graham, Carlisle (accepted)	£1182

London.—Holborn Valley Improvements, Contract L.—For new street from Shoe-lane to Farringdon-street. Wm. Haywood, Esq., C.E., Engineer. Quantities supplied by D. C Nichols, Esq.:—

Hill, Keddell, and Waldram (accepted)	£16115

London.—For Invalid kitchen, Sandy's-row, Spitalfields. Mr. T. Chamberlain, architect. Quantities supplied by S. B. Wilson, Esq.:—

Ashby and Son	£1527
Pritchard	1464
Brass	1428
Newman and Mann	1415
Axford	1400
Hill, Keddell, and Waldram (accepted)	1394

London.—For pulling down and rebuilding No. 13, Bell-yard, Temple Bar, for Messrs. Stevens and Haynes. Mr. Edward Low, architect:—

Clemence	£811
Beeton (accepted)	690
Warne	560

London.—For buildings in Chapel-street, Edgware-road. Messrs. Bird and Walters, architects. Quantities supplied:—

Gammon and Son	£8887
Newman and Mann	8736
Williams and Son	8650
Mansfield and Price	8096
Ebbs and Sons	7987
Kelly, Bros.	7923
McLachlan	7920
Henshaw	7895
E. Brown (accepted)	7495

Lopham, Norfolk.—For new schools and master's house at Lopham, Norfolk. Mr. R. M. Phipson, F.S.A., architect:—

Downing	£972 0
Hawes	900 0
Newell	774 10
Lacey	765 0
Bishop	730 0

Reading.—For new seed stores and stabling for Messrs. Sutton and Sons. Messrs. Wm. and J. T. Brown, architects:

Strong	£2735
Dunn	2539
Searle	2501
Woodruffe	2490
Gibson	2488
Sheppard	2478
Matthews	2446
Barincoat (accepted)	2350

Rotherhithe.—For new granaries at Canada Wharf, for the Ventilating Granary Company, Limited. Mr. James Edmeston, architect:—

Cowland	£12619
Lawrence and Sons	12560
Killby	12548
Brass	11966
Longmire and Burge	11695
Hill, Keddell, and Waldram	11660
Browne and Robinson	11620
Foster	11570
Watts (accepted)	11255

Seven Sisters Road.—For additions and alterations to the "Poplars," for H. H. Wettenhall, Esq. Mr. James Edmeston, architect:—

Taylor	£813 0 0
Smith	795 19 0
Vivian	795 0 0
Green (accepted)	695 0 0

Shepherd's Bush.—For completion of premises, 3 and 4, Cambridge-terrace, Belgrave-road, Shepherd's Bush. Mr. R. A. Lewcock, architect:—

Holmes (accepted)	£220

Stockwell.—For gas pipes and fittings for the Fever Hospital at Stockwell, for the Metropolitan Asylums District Board:—

Forrest and Son (accepted)	£220 15 0

THE BUILDING NEWS.

LONDON, FRIDAY, MAY 13, 1870.

ARCHITECTURE AT THE ROYAL ACADEMY.

A CERTAIN feeling of regret forces itself upon the minds of those who take an interest in architecture to see the invariable emptiness of the special gallery devoted to architecture at the Royal Academy. It seems strange that the public should find so little attraction in the representations of that art which in spite of themselves daily claims their attention, even if an unwilling one, in the streets of every town. One would think that it mattered greatly to them to be informed as to what public buildings their money (as ratepayers) is to be expended upon, and that they would be glad to know what are to be the semblances of the houses of their neighbours in case they may however, have to build for themselves. The fashion, sets not in this direction; the merest utilitarianism contents the multitude as to the tenements in which they are housed, and they crowd only to inspect the portable works of art with which their buildings can be furnished, which they may perhaps sell to advantage as well as buy, or, at any rate, carry about with them as they migrate from one uncared-for dwelling to another.

Yet though the collection of architectural drawings is not so numerous this year as we could wish, it would well repay attentive examination. It is too much the habit to excuse the carelessness with which these architectural works are passed by with the charge that the fault is due to their authors, and to state that the drawings themselves are not worth the attention they would solicit. Any such charge on the present occasion we can conscientiously rebut. We think that there is as much art work to be found in the drawings which occupy one side and a half of this gallery, No. 9, as in any other gallery in the exhibition; but the character of it is such as to need care and trained knowledge to appreciate—qualities, we regret to say, rarely to be found in the mass of those who frequent this or any other exhibition.

Under the head of "Drawing," there is but a poor show at the Academy of sketches or drawings of ancient buildings. Those at the Architectural Exhibition are both better and more numerous. The science of photography has to a great extent superseded the art of delineation of such works, which is much to be regretted, and there are few artists who now seek to paint subjects which made the reputation and the fortunes of men like Prout, Nash, and other artists contemporary with them. It is true that the Water Colour Society can boast still of some good labourers in this field, and that Messrs. Brewer, Deane, and Cole possess the powers we are desiderating. Neither of them, however, have exhibited in this department of this exhibition, and Mr. R. P. Spiers almost alone carries off its honours with some nice sketches of old houses from the Rhineland, to which, however, we must object somewhat on the score of slightness and haste. They serve, however, to show that he could, if he would, become an excellent and accurate architectural draughtsman.

Passing from these "drawings" to those which are legitimately headed "Architecture," we feel that we ought on this occasion to follow their order of rotation in some degree, and that we must leave to another time any remarks upon their general character, if grouped as our inclination might lead us to prefer.

No. 741, Interior view of S. Paul's Church, recently erected at Upper Holloway (H. James and Son), is a fair example of the modern style of brick-lined apsidal-ended churches, not devoid of dignity of proportion, but with little refinement of detail or novelty of design.

No. 742, the Church S. Paul, Leicester, by Ordish and Traylen, is more noticeable. It is of a somewhat exaggerated type, and shows a rather overstrained feeling for picturesqueness, while the study given to the detail seems under the mark; nevertheless it is bold and effective, a lofty apsidal chancel, with long triplet windows on east face of almost German Gothic proportion, and a tower placed in juxtaposition with it at the re-entering angle formed by the south aisle and the chancel rises absolutely featureless till clear of the roofs, when it breaks into an octagon, with turrets at each angle, finishing with a tapering spire.

No. 743, Interior of S. Mary's Church, Beddington, and 761, Exterior of same, by Joseph Clarke, is an interesting old church, thoroughly and well restored, with rich and massive roofs (that to chancel with bold arched braces and angels as hammer beams), carved bench ends, with poppy heads to the seats, and traceried screen. A creditable amount of decorative treatment to the east end is suggested in the drawing. Mr. Clarke also exhibits another interior, that of the parish church of Bishop Stortford.

No. 744, Design for the Decoration of the Winter Smoking Room in new Tower now being erected at Cardiff Castle for the Marquis of Bute, is, with other drawings by Mr. W. Burges, a feature in the exhibition. It is, as apparently its inhabitants are intended to be, thoroughly mediæval. This is an apartment within the massive structure the exterior of which is shown in No. 817. Another apartment, designed as a summer smoking room in the same tower, is shown in No. 752. The external architecture will commend itself more than the drawing of it, for colossal scale is its main and characteristic merit. The details are bold and simple, even to excess. We cannot here enter into the question as to whether it harmonises with the Edwardian Castle to which it is attached, but Cardiff Castle has suffered more than most of its five Welsh compeers, and so little of value is left that restoration was impossible, and Mr. Burges has perhaps justifiably given reins to his fancy for massive French Castellated work. As regards the decorations of the apartments within, they teem with his rich and quaint fancy, but seem wanting in repose. The better effect, as being the quieter, is that of the winter smoking room, which has a high wooden panelled dado and a doorway with a pointed arch, surrounded by a wide Moresque-looking architrave on a gold ground, gleaming, as also does the gilded slope of the chimney-piece, from a background of blue of a strong but refined tone. The ceiling is like the walls, but with the ribs enriched; hawking and other scenes, and ornamental decorations, are represented on the ground thus formed. The other apartment is not dissimilar in treatment, but more crowded with work, and leaves a sense of its being overdone. Here, again, the chimney-piece is the central feature, with its tapering slope gilt and studded with crimson hearts, and on a corbel from the mantel stands a figure of Cupid, clad in green, with purple wings, above the motto, *Æstate Viresco*. Two massive columns in this apartment, with portentous corbellings as capitals, are of a character of design which we honestly allow we fail to comprehend, and on that account possibly cannot admire the ceiling to the gallery; the covings on either side are well and quaintly treated.

No. 781, Knightshayes, the seat of J. H. Amory, Esq., M.P., now also being erected from the designs and under the superintendence of Mr. Burges, is much more to our taste. It is stately and bold, and its mediævalism not obtrusive.

No. 745, Kenwood Tower, Highgate, now erecting for E. Brooke, Esq., by Messrs. Salomons and Jones, is a very ordinary Elizabethan jumble of pseudo-Gothic outline and pseudo-Classic details, which, if it did not here seek architectural criticism, might otherwise inoffensively fall beneath it if the utilitarian wants of its owner are duly fulfilled.

No. 748, The Prince's Theatre, Manchester, by A. Darbyshire, has a frontispiece to the stage which is a sort of parody upon an architectural composition, with an entablature sufficient, if real, to crush the columns supposed to support it. Its very ordinary decorative treatment, No. 749, is not amiss of its class, and would not be so inharmonious as other examples have been with the paintings of Mr. Marks, which are the real artistic sustenance of the composition.

No. 750, the Interior of Inverness Cathedral, by A. Ross, presents a certain stateliness and simplicity in its pointed barrel-vaulted nave, and lofty crux arches and apsidal chancel beyond, but the decoration is poor. The space over the arcade is too deep, not being divided off as a triforium space, and the clerestory, with depressed arches, is very ugly and objectionable.

No. 751, Elevation of a Library and Museum, &c., now being erected for the governors of the Sussex County Hospital, by E. E. Scott, seems a building suitable for its purpose, with small architectural pretensions. We should have preferred it, however, with less.

No. 753, N.E. view of new Mansion at Petersfield, by Mr. R. W. Edis, is a very pleasing drawing of a satisfactory building, which, however, we fancy to have been exhibited before. Mr. Edis also sends some sketches in France and Italy, Nos. 787 and 795, and No. 802, a new warehouse in Budge-row, City, now in course of erection, which is a very good adaptation of Gothic architecture for such a purpose.

No. 754 is a painstaking and interesting drawing giving the restoration of the Piscina in the Baths of Diocletian at Rome, as suggested by the late Professor Cockerell, by T. E. Goodchild. The colouring is somewhat feeble and cold.

No. 755 is a drawing, by an anonymous contributor, of no small pretensions. It seems to be a design submitted in competition for the Manchester Town Hall. The drawing and design are ambitious and have merit. The grouping is good, but the details of that rank development of Gothic which seems to find favour in the north, but which needs delicacy and refinement.

No. 756 is a striking drawing of the interior view of S. Peter's Church, Wickham-road, Deptford, recently erected from the designs of Mr. Marrable. It is to our mind more successful as an engineering than an architectural achievement. Great brick arches span the nave, and seem a costly expedient to support the comparatively far too slight intermediate roofing.

No. 757, Longstowe Hall, the seat of Sidney Stanley, Esq., by W. M. Fawcett, if new, looks old and of a good type, which would be no small praise.

No. 759 is a proposed Church for South Hampstead, by H. S. Legg, of the featureless and commonplace character too familiar in the suburbs of the metropolis.

No. 760, S. Andrew's Church, Bradfield, recently erected from the designs of G. G. Scott, R.A., is exhibited by Mr. J. D. Wyatt, and is an excellent drawing in his well-known manner, hung too high for the examination it and the building deserve. As the only work exhibited with which Mr. Scott's name is associated, we are glad to notice that it appears to be a modest and picturesque group of buildings, apparently very suitable to its purpose.

(*To be continued.*)

CHURCHES WITH WIDE BAYS.

ONE obvious way of lessening the obstruction to sight caused by the nave columns of a church is to place them further apart and so use fewer of them. If each arch of the nave arcades, instead of being 10ft. or 12ft. in span, were increased to 20ft. or 30ft. there would of course be only one half or one third as many piers to shut out the view of the pulpit or altar. But there are two special difficulties in the way. First, the wider the arches are the more they rise, and, unless there is some further alteration, the higher the whole building must consequently be. Secondly, to enlarge the bays tends to lessen the apparent size of the building generally, or, in technical language, to destroy its "scale." A church divided into five bays of length will usually look larger in every way than an equal sized one divided into only three. These two difficulties have helped to counteract the advantages of wide spacing, and in recent churches it is rarer than might have been anticipated. S. Peter and S. Paul's, Cork, designed by Mr. E. W. Pugin, has the nave piers some 22ft.* from centre to centre. At All Saints', Margaret-street, they are two or three feet closer, and at S. James the Less, Garden-street, their distance is about 18ft. But in most of our modern churches, as of our ancient ones, the bays seem to average from 12ft. to 15ft. each. Our cathedrals were of course set out on a rather larger scale, though some of them, such as Ely and Lichfield, have the nave piers barely 17ft. from centre to centre. Of the twelve abbey churches in Mr. Sharpe's "Parallels," Tintern has the widest bay (18ft. 3in.), and Netley the narrowest (14ft. 3in.)

English Gothic, as it has often been remarked, delighted in multiplicity and smallness of parts. Wide bay churches must therefore be sought rather on the Continent than here; and it may be useful to examine a few of them, and to see how the two difficulties of extreme height and want of scale are sometimes met. Extreme height indeed often seems to have been looked upon as an advantage rather than an objection. At Antwerp Cathedral, for instance (with 29ft. bays in the middle aisle), there is a clerestory of immense depth above the arches. At Magdeburgh, with 40ft. bays, there is likewise a very deep clerestory, though the arches are of low proportion. Here their vast size is exhibited by putting two bays of vaulting, and two three-light clerestory windows over each. At S. Cross, Breslau, there are 30ft. bays in the nave, and 15ft. ones in the side aisles. Two aisle windows thus face each arch, and there is an external buttress opposite to its centre. In Spain, Mr. Street's labours have introduced us to a series of churches designed on a system of surprising magnitude. At San Benito, Valladolid, the bays are 31ft. each; at the Cathedral of San Salvador, Avila, 34ft.; at the Collegiata, Mauresa, 32ft., and at Siguenza Cathedral, 39ft. At the new (15th century) Cathedral of Salamanca they are 33ft., two two-light windows, with a circle over them, standing above each arch. At Barcelona Cathedral, with 30ft. bays, and comparatively small piers, there is a low triforium arcade, and a range of rose windows enclosed by the wall rib of the vault to serve as clerestory. But another church at Barcelona, that of S. Maria del Mar, goes far beyond this, and has its nave piers no less than 45ft. from centre to centre. Compare this even with some of our cathedrals—such as Ely, Hereford, or Lichfield. Three bays in this Spanish church are equal to eight in our English ones—and the former would have but two columns where the latter have seven. It will hardly be questioned which principle best fulfils the requirements of a congregation—that with a crowd of columns or that with vast unobstructing arches. The difficulties in applying the latter cannot be overlooked—but it does not seem impossible to reduce them. At S. Maria del Mar, the height is kept down by a peculiar form of clerestory. The wall-ribs and the nave arches both spring with different radii from the same level, and the former just rise high enough to allow of small windows above the summits of the latter.

Compared with any of our own churches, that just described seems incomparably large in its parts. Yet examples of still wider bays exist in Italy. Florence Cathedral has its piers about 60ft. from centre to centre. But architecturally it shows (at least in its nave) what to avoid rather than what to imitate. It is as deficient in scale as a building can well be. There are no secondary divisions; no minor arcades or groups of windows, or double aisle compartments, to assist the eye in realising how vast each main arch is. In each 60ft. length of the aisles there is one long narrow two-light window, and one small round one in each bay of the clerestory. The result proves how important it is, if we adopt wider bays than usual, to provide some means of showing their real size. To neglect this is not only to detract from apparent magnitude and impressiveness of the building, but to produce a straggling, bald, and uninteresting design. Whether it is to be effected by double roofing compartments as at Magdeburgh, and at the Franciscan Church, Erfurt; by extra clerestory windows, as at Salamanca; by an arcaded clerestory, as in the 60ft. bays of Treves Cathedral; by gallery arcades, as in many Byzantine churches, including S. Mark's, Venice; or by numberless small windows to the walls and domes, as in the same examples, may depend on special circumstances in each case. But once accomplished, either by these or any other means, the chief objection to a wide bay plan would be removed; and without approaching the dimensions to be found in many Spanish or Italian churches, we could dispense with a large proportion of those nave piers which now produce so great an obstruction to seeing and hearing the service.

* Most of the dimensions in this paper (which are from centre to centre of piers), are measured from plans, and do not pretend to absolute exactness.

TRUSSED GIRDERS.

THE solid balk, whether in its rough, unhewn state, or when squared and planed, constitutes the simplest and most primitive form of a beam or girder; but even had it nothing more to support than its own weight, the limits of its capabilities would very speedily be reached. So soon, therefore, as it became necessary to span intervals, and carry loads exceeding the modest proportions attainable by the simple balk, the never failing ingenuity of man was called into play to devise some means of accomplishing the task. Obviously two courses were open for adoption. The one consisted in employing a totally different principle of construction; the other in modifying the existing one so as to increase its powers of resistance, and render it equal to the additional duty required of it. In other words, the latter modification was the conversion of the simple beam or log into a trussed girder; the theoretical and practical value of which we propose examining and investigating in the present article. Ordinary examples of these trussed girders, more or less complicated according to their spans and the load they have to carry, are to be witnessed on nearly every wharf on the banks of the Thames, either above or below London Bridge. They are employed as movable gantries and travelling stages by which to load and unload barges, carts, and other receptacles for goods and stores of various kinds. The first and simplest of these is that in which a bracket of cast iron is applied to the under part of the beam at its centre, from which a couple of wrought iron rods are carried to the ends of the beam to which they are respectively attached. This attachment may be made in one of two ways. The rods may be simply passed obliquely through the ends of the beam, and held tight by a nut and washer; or their extremities may be fastened in a similar manner to small castings, which are fitted on to the ends of the beam, and provided with projecting lugs to receive the rods. The former is the cheaper method, and answers well enough in cases where the span and load are small; but the latter is a more workman-like plan of doing the thing, and makes a better job of it. It prevents the necessity for boring holes in the timber, which should always be avoided if possible.

FIG. 1

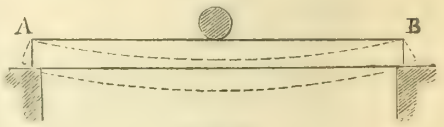


FIG. 2

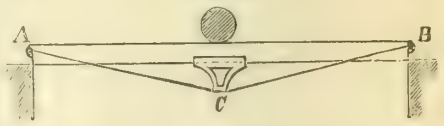
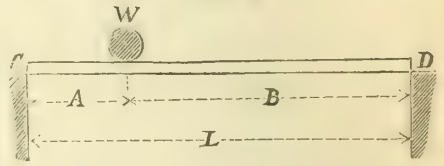


FIG. 3



An inspection of figs. 1 and 2 will demonstrate how the first step is made in trussing a plain beam or balk of timber, and the effect that is produced by so doing. Let us consider firstly the single beam in fig. 1. If we suppose a single weight placed on the centre of the span, or what amounts to the same, regard a uniformly-distributed load as concentrated at that point, the tendency will be to deflect the beam from the horizontal into a position shewn on an exaggerated scale by the dotted lines. With a moderate weight there will be a perceptible deflection; but so long as it does not pass certain limits, there is no danger of failure to be apprehended. It is impossible to determine what must be the amount of the weight to produce incipient flexure, and upon this point much uncertainty and diversity of opinion prevail among architects and engineers. Some eminent authorities, like the late Mr. Hodgkinson, maintain that a very small weight is sufficient to produce incipient deflection, while others contend that there is a minimum weight, proportional, of course, to the dimensions of the beam and the size of the span, necessary to cause flexure. What the exact truth of the case may be matters very little to practical men. So long as we know that "a good stick will bend before it breaks," we need never put such a load upon it as will cause it to bend so much as to be in danger of ultimately giving way. The general effect of trussing is certainly to increase the strength of the beam or structure, but, at the same time, it does not diminish the strain resulting from the weight. This may appear a little paradoxical, but a consideration of the two cases in figs. 1 and 2 will render the matter perfectly clear. If the weight in the trussed and untrussed beam be the same, the span the same, and the depth also, then the strain at the centre, or at any other intermediate point, will be also the same. Let the weight equal W, the span L, and the depth D, then the general expression for S, the strain at the centre for any beam, trussed or untrussed, is

$$S = \frac{W \times L}{4 \times D}.$$

A little reflection will show that whether the load be transferred in equal portions to the abutments or points of support by the direct agency of the beam alone, as in fig. 1, or by means of the trussing, that is, the cast iron strut and tie rods, as in fig. 2, yet the result is the same. Half the total weight is ultimately in both cases conveyed to each abutment, and in both

instances their separate vertical reactions are identical. This known reaction may be made use of to ascertain the compressive strain at the centre of the girder, and prove the formula already given. The reaction at each abutment can always be directly ascertained from the position of the load, and it will be better, perhaps, to treat this subject generally, and then apply the results to the particular cases in question.

In fig. 3 let the point of application of the weight W divide the beam into the two segments A and B, whose span is equal to L. Calling M the moment tending to break the beam at that point, we have the general formula applicable to every case,

$$M = \frac{W \times A \times B}{L}$$

Let L = 16ft., D = 15in., A = 4, B = 12ft., and W = 10 tons. Substituting these values in the equation we get

$$M = \frac{10 \times 4 \times 12}{16} = 30 \text{ tons.}$$

This represents the moment or effort of the weight W to fracture the beam at the point where it is applied. But what is practically required is the actual resulting strain at this point, which put equal to S. Now S is equal to the moment divided by the depth of the girder, since the strength of the beam is directly proportional to its depth. Consequently $S = \frac{M}{D}$, and bearing in mind that the units in the value of M are feet and in D inches, and therefore M must be multiplied by 12 or D put in feet and decimals instead of inches, the value for

$$S = \frac{M \times 12}{D} = \frac{W \times A \times B \times 12}{L \times D}$$

$$= \frac{10 \times 4 \times 12 \times 12}{16 \times 15} = 24 \text{ tons.}$$

This calculation may now be checked independently by the method of the known reactions of the two abutments. Referring to fig. 3, it is demonstrated by the principle of the lever that the total weight W is conveyed to the two abutments in two parts or subdivisions, which cause reactions or upward pressures upon the end of the beam. These reactions are equal to the portions of the total weight transferred to the supports, and are inversely proportional to the respective distances of the weight W from each point of support. Thus the portion of W conveyed to the nearest abutment C is proportional to the distance B, and that which is transferred to the further support D is proportional to the distance or segment A. Let R be the vertical reaction at C, and R^1 that at D, then

$$R = \frac{W \times B}{L} \text{ and } R^1 = \frac{W \times A}{L} \text{ or } R^1 = W - R;$$

since there is always this general equation, $W = (R + R^1)$. The reaction being known, the actual moment at any point tending to break the beam is easily found, since it equals the vertical reaction at either abutment, multiplied by the leverage—that is, the distance of the weight from that particular abutment. Consequently, the moment to break the beam at the point of application of the weight is $M = R \times A = R^1 \times B$. Substituting for R, R^1, A and B their values we have

$$M = \frac{10 \times 12 \times 4}{16} = \frac{10 \times 4 \times 12}{16} = 30 \text{ tons.}$$

and the actual strain $= \frac{M \times 12}{D} = 24$ tons,

which is the strain already obtained by the general formula given above. To apply this now to the particular case in question of a weight at the centre, in this instance in the equation $S = \frac{W \times A \times B}{L \times D}$, A becomes equal to $B = \frac{L}{2}$, and therefore the equation may be written

$$S = \frac{W \times \frac{L}{2} \times \frac{L}{2}}{L \times D} = \frac{W \times L^2}{4 \times L \times D} = \frac{W \times L}{4 \times D},$$

the equation given above.

The compressive strain, therefore, in the beam, in both fig. 1 and fig. 2, will be equal to 24 tons. There is still another method of ascertaining this strain, which is by a geometrical analysis. These different ways of arriving at the same result point out at once how interesting is the study of the analysis and determination of strains.

It will also demonstrate to many of our readers how little real information is to be gained from books on the subject. Nothing but a close and searching investigation will prove to the student what a field for inquiry this branch of technical science presents. As one proceeds in his own course of reasoning and reflection, he perceives—it might almost be said he invents — independent and fresh methods of solving the numerous problems that the various forms of trussed and braced structures, whether bridges, roofs, or other examples, continually present. It must be remarked that, although the general principles which govern the distribution and transference of the strains in a braced or trussed girder are constant, yet each particular form of truss requires to be dealt with individually, as one gives no clue to another. This is the reason why so few thoroughly understand the subject, and why we constantly perceive such unscientific, wasteful forms of trusses designed and erected. We must reserve for another article the elucidation of the third or geometrical method of arriving at the strain upon the beams already partially investigated.

THE INFLUENCE OF THE FINE ARTS ON CIVILISATION.*

(*Concluded from page* 340.)

THE little peculiarities of society, rather than the general features of human nature, are the theme of the modern dramatist: so we cannot wonder what influence he has should be ephemeral—unlike that of great Art, which lives for all times and all places. There is no help for this absence of original genius, or even for the want of appreciation for high and earnest work. The temper of the age is not of a character to call forth the one, and so it ignores for the moment what has received the admiration of ages, hoping thereby to forget, or to silence, a just rebuke at its prevailing littleness. We are so immersed in our worldly affairs—each man bent on rapidly making a fortune to enjoy in the present, rather than a decent competence to suffice for the future—that in our moments of relaxation the struggle of the day has robbed us of the mental effort necessary to appreciate real excellence, and so we seek for pleasure in whatever will tickle or excite our senses. Powers and persons have alike changed places, and the scene-painter and the ballet-master obtain that public favour which was formerly bestowed on the poet and the actor. Tragedy and comedy we have not; but in their place we have that mongrel production called "a drama," where sensation performs the function of the former, and buffoonery that of the latter. Nor, in spite of the progress of civilisation and the advancement of morality, does the presence of vulgarity on the stage produce disgust, or that of indecency arouse indignation. We are such firm friends of Realism that the representation of ignorance and vice is regarded as useful a method of instruction as the illustration of wisdom and virtue. When such things occur in "high" places, who can marvel at their presence in low ones? Poverty and ignorance may freely denounce wealth and education, which they have not; but when their more materially-favoured brethren show any favour to vice, they feel that error at least is common to all, and that "one touch of nature makes the whole world kin." I have taken the painful trouble lately to visit some of the lowest resorts of amusement, and the character of the entertainment showed that the lower classes were anything but backward in imitating the fashion set them by their more gifted brethren. Now, with our unbounded love of perfect liberty, it would be folly to suppose that our ruling powers should beneficently interfere in enforcing decency in public performances, or that the appointment of a really efficient censor of the stage would be received with anything but disgust and disaffection. Possibly there are other means, more effective than coercion, to stop the march of vice; but even if one—*a good example*—were set, it requires good sense and some degree of wisdom to follow it. At least, it might be tried immediately—and produce some effect—without waiting for the far-removed influence which is promised (how often has it been promised!) from a new "Bill for Education." In making these remarks, I have not been actuated by any desire to depreciate the advantages of living at this present date of the world's history. But I think it were wise, before we throw stones at the glass houses of other ages, to reflect that we live ourselves in a structure of the same material, equally huge, and, in spite of the progress of Science, not less liable to injury from without.

I am no purist in art, nor have I any desire to confine its current within narrow bounds, as some of my art-antagonists assert. I might say, with justice, that the stigma of purism—such as it is—belongs to them. The doctrine which they preach—that art should only produce pleasure—has found favour in all ages; but, happily, the success of labourers even in an opposite direction proves how narrow and untenable is that doctrine. Man—born to suffer as well as to enjoy—has the capacity to receive mental profit equally through pain or pleasure; and however much, in moments of weakness, we may deplore the presence of pity or even terror as active agents in the career of humanity, yet they are necessities, and cannot be ignored. So Art, deriving its very sustenance from its power to represent Nature, takes a narrow view of its mission in despising any natural means which may enable it to fulfil the object in view. But in performing his mission—even by means of pity or sorrow—the true artist avoids those features which gives to his embodiments a vicious sensationalism. Phrynichus, an Athenian poet, was publicly censured, and also fined, for representing on the stage a contemporary calamity; and though the sentence may appear arbitrary, it showed—as Schlegel justly observes—a correct feeling of the proprieties and limits of art. I think, however, if Phrynichus could see what is going on now, he would have ample reason to dispute the justice of his punishment; and, moreover, he would have regretted the loss of that laurel crown which now so liberally girts the temples of his successors in that path of art of which he was the pioneer. For, so far from exciting the attention by the intricacies of the plot and the truth and beauty of the language, which are the legitimate means of dramatic success, the aim now of the author and manager is to electrify the audience by fear and terror; and the success of a play solely depends on what are called "striking situations." Surely this is not a thing to dwell on with pleasure; for, if my assertion be true, that the intellectual and moral state of a nation is mirrored in its public entertainments, the prospect is far from pleasant. When Rome was the mistress of the world, the very centre of civilisation, its people forgot in prosperity the virtues which were so prominent in adversity, and their moral and intellectual condition—as one is, so always will be the other—was abject in the extreme. And their degradation was shown, as usual, in the character of their entertainments. In the gratification of the eye, that of the ear was altogether lost; rope-dancers and white elephants were preferred to every kind of dramatic entertainment—the embroidered robe of the actor was his chief weapon of success; and fights of gladiators, with the presence of real blood, crowned the edifice. To the latter degradation we have not yet arrived, and I hope never will arrive. But—barring that one feature—insert Paris and London in the place of Rome, and the picture of the past is that of the present, with, I fear, an additional smear of immorality. Not only are Blondins and Leotards worshipped by the present race, but Parisian exotics now bloom not only in English hotbeds of luxury, but in the open air. I cannot dilate on the theme; if you want ocular proof of my denunciation, go and see a burlesque, or rather an opera, by Offenbach.

The lecturer concluded with some remarks on the evil influence of Fashion on Art, appealing to the ladies present to resist as far as possible the false teachings of that power, and so avoid the frequent and violent changes consequent on obedience to her dictates.

* Read by Henry O'Neil, Esq., A.R.A., on the 21st ult. before the Society for the Encouragement of the Fine Arts.

The Surveyor.

PAROCHIAL ASSESSMENTS.

(*Concluded from page* 339.)

Valuation of Farm Homesteads.—In estimating the rateable value of farm homesteads, several matters have to be taken into consideration. For example: the buildings may be very much in excess of the actual requirements of the lands of a farm; but it is obvious that a tenant can only be reasonably expected to pay such a rent as the buildings which he actually requires would command. Even that rent may have to be diminished instead of increased, from the fact that the repairs and insurances of the larger buildings are more costly to the tenant than the repairs and insurance of buildings of the proper size would be.

It may, however, happen that the occupier of such a farm may also occupy, as a separate rateable hereditament, land, either wholly without buildings, or otherwise deficient in that respect, in which case the rateable value to him of the buildings previously alluded to will be increased.

Valuation of Trade Premises, Mills, Factories, &c.—In estimating the value of trade premises, such as a factory fitted up with machines, a foundry with furnaces and forges, or a brewery with fixed steam engines and vats, the value of the machinery as enhancing the annual value of the freehold of which it forms part is to be taken into consideration.

An important decision in respect of the rating of mills was given in the case of Staley and another v. Castleton (33 L. J. M. C., p. 178). The mill was fitted to its full capacity with the machinery useful and necessary for a cotton mill; a steam engine was fixed for the purpose of turning the machinery, and steam pipes from the boilers were carried through all the rooms in the mill for the purpose of warming them. Some of the machinery was fixed to the floors in order to its steadier working, while, in other instances, it was merely placed upon the floors of the mill. According to the custom of the trade, the machinery was in the nature of tenant's machinery, or fixtures. Before the American war, the property had been of considerable annual value as a cotton mill; but, in consequence of the state of trade during the war, the mill was closed. Nevertheless, the machinery was kept in it, and a man was employed to attend to the fires for the purpose of keeping up a proper degree of warmth, and to keep the machinery in a state of repair.

The Court held that the mill was thus used as a storehouse for the valuable machinery that it contained, and was to be valued for assessment to the extent of the rent which it would command as such storehouse.

Following this decision came another important case, Harter v. Salford. (34 L. J. M. C., p. 206.) The appellant for many years carried on the business of a silk manufacturer; but, in 1863, he gave up business with the intention of never resuming it. The mill and premises were advertised for sale. The decision was that, although not in use as a mill, the buildings were to be valued as storehouses for machinery.

Hotels, refreshment rooms, Epsom and other race stands, canteens and similar trade premises which, by reason of their special situations command rents in proportion to the extent of the trade which can be carried on in them and nowhere else, must be valued in connection with their trade receipts, *i.e.*, from the gross receipts must be deducted the working expenses necessary to earn the receipts, allowances for trade profit to the tenant, for interest on the capital which he must necesarily employ, and for risks and casualties. The balance is the rent which he may reasonably be expected to be willing to pay to his landlord as rent.

In valuing all descriptions of house property, the question constantly arises,—is cost ever the measure of the rateable value of property? In giving his decision in the Mile End Old Town case, Lord Denman says, "the outlay of capital might furnish no criterion of the rent a property should yield, since such capital may have been injudiciously expended, and what was costly may have become worthless by subsequent changes." It should be observed that Lord Denman did not there say that cost was never the measure of value, and, obviously, it sometimes is. Assume, for example, that the guardians of a Union are in want of a workhouse, and that some landowner within the Union is possessed of a building exactly suited for such purpose, but that he requires a rent of 1000*l.* a year for it. The guardians find, upon inquiry, that they can build a new workhouse and provide the land at a cost of £10,000, and that they can obtain the money at the rate of 5 per cent. per annum, which will equal a rental of £500 per annum. They elect to take the latter course and build the workhouse, the rateable value of which is £500 per annum, because that sum is the highest rental which it would be reasonable to expect them to give. Assume, however, on the other hand, that the landowner was unable to get a tenant for his building, for any purpose, at a higher rent than £250 instead of £1000 a year, and that he therefore would be willing to let it to the guardians at £250. In this case, the rateable value would be £250 per annum only, because it would not be reasonable to suppose that the guardians would pay for any other similar building a higher rent than that at which they had been able to take this from the landowner.

In estimating the rateable value of bridges, as in the case of railways, it does not follow that any direct receipts arise in the parish which is the subject of the valuation. The case of the Queen v. the Hammersmith Bridge Company is one in point. It was there held that, although the whole of the receipts were in the parish of Hammersmith, yet the bridge itself was the direct source of the rateable value, and that such net rateable value, when duly ascertained, was to be apportioned between the parishes according to the length of the bridge in each.

Valuation of Tithe Rent Charges.—The rateable value of a tithe rent charge is the rent which a hypothetical tenant might be reasonably expected to give for it annually, such tenant having to pay the usual tenant's rates and taxes upon such tithe rent charge and to derive some remuneration for his time and attention in collecting it (Queen v. Capel).

In the case of a clergyman whom, by reason of the number of parishioners and the value of the incumbency, the bishop of his diocese could compel to keep a curate, the reasonable salary of such a curate was, in the case of the Queen v. Goodchild directed to be allowed; so also in the case of the Queen v. Lamb, where the duties of the incumbent were greater than one man could perform, the curate's salary was directed to be deducted; but, this allowance for a curate has, by the recent case, the Queen v. Sherford, been overruled, so that it must now be taken that such a deduction cannot be allowed.

Valuation of Coal Mines, &c.—Coal mines brick-fields, clay pits, slate quarries, &c., which involve the removal of portions of the soil, must be valued according to the rent and royalty which it is reasonable to expect the occupier would pay the landlord for that species of occupation. In the case of the Queen v. Westbrook it was held that a royalty so paid must be considered as a portion of the rent.

Valuation of Saleable Underwoods.—Saleable underwoods must be valued at the rental at which they might reasonably be expected to let, according to the quality of the wood and the situation of the land.

The valuation of railways, gas, and water-works involve considerations so special that the subject is reserved for a separate paper.

CHIARO-SCURO IN ARCHITECTURE.

(*Concluded from page* 316.)

WHILE Salisbury is designed for length, Amiens is designed to look great by greatness of parts and greatness of treatment. If Salisbury Cathedral looks long through being in many parts or bays, so does a street by consisting of a great number of small houses; but it does not for that reason look great. Salisbury is not so great a building, though it looks longer than Amiens, the interior of which strikes at first sight, not so much with an appearance of vastness as of a noble simplicity and majesty, arising from greatness of scale, greatness of module, and grandeur of treatment. Salisbury Cathedral might have been less adapted to give effect to scenic processions, but it would have been a greater building, finer and more meritorious architecture, had it been designed on the principle of Amiens.

I have heard the French cathedrals accused of being shapeless outside, though beautiful within; but if a building is designed for greatness of internal effect, and truthfully constructed, it cannot be shapeless outside. For the same reason that Amiens is a much finer building inside than Salisbury, it must be finer outside for being of greater parts and nobler proportions, as I have alrerdy asserted it to be in speaking of composition.

But there is one great interior in the East where these principles are illustrated, which I must not omit to notice—S. Sophia's, at Constantinople—which is in every respect one of the most noble and beautiful apartments on earth, satisfactory in every respect. Most other great buildings—Egyptian or Greek temples, or mediæval cathedrals—were more or less a series of great avenues, but this is one great apartment, with every concomitant of greatness and beauty. It is better proportioned than that of S. Peter's at Rome, and than the centre compartment of S. Paul's at London, or of any Gothic cathedral; while it has as much unity, with infinitely more variety and picturesqueness than the Pantheon at Rome. Such an assemblage of grand and beautiful architectural features—domes, semi-domes, colonnades, arcades—harmoniously combined in one great interior, appears nowhere else. It is the most beautiful covered area on earth, and had it been united to a worthy exterior—an exterior in keeping with it, and expressive of it—the whole would have been the greatest building in the world, the acme of architectural perfection. But it is married unfortunately—as is S. Stephen's, Walbrook—a Venus to a Vulcan—to an exterior monstrosity.

This quality of breadth inheres to a great extent also in the architecture of Sicily, which, like the clime that blends the oriental palm, and aloes with the orange tree, the fig, the olive, and the vine, unites and blends the architecture of the east and west in the most artistic and beautiful manner. But in no buildings is it better illustrated than in many of the domestic buildings of the middle ages, with their open-work fronts or arcaded loggias, so favourable to true architectural beauty, and reminding us of the Chester rows. Among these I would particularize the Venetian Gothic palaces. I am not referring particularly to the ducal palace, in which building I for one can see nothing of the surpassing beauty that some can see, or affect to see, in it—but to the Cà d'Oro, Foscari, and one or two others. In these I see exceeding grace and beauty. The Cà d'Oro Palace carries to the extreme of grace and delicacy the open-work principle which charms us in many more northern lands, of which the house of Francis I. and some of the Hotel de Villes are examples, among which the façade of the Hotel de Ville at Arras deserves special mention.

The Doge's palace I never saw but on paper, and therefore cannot say how it might affect me in an actual survey of it, or how I should feel if I saw it with all its detail of colour and ornament; but no view I ever saw of it ever kindled in me one spark of emotion. I have felt the beauty of the Parthenon; of the Mosque of S. Sophia, of the choir of Beauvais, of most buildings noted for their beauty, but I have not felt the beauty of the Doge's Palace. The Ducal Palace of Venice is certainly one of the most interesting buildings in the world in regard to style and architectural history. Like the city itself, the beautiful bride of the Adriatic, it must awaken a host of stirring memories of its bright and glorious past. This is all true: but I do not see the surpassing architectural beauty ascribed to it by Mr. Ruskin, and I do not believe it exists: the very fact of Mr. Ruskin being alone in his admiration of it—at least till his followers adopted the opinion—proves it cannot be the Cytheræa of architecture; had it been the critical world would have found it out. It is never left for one man to proclaim the most lovely woman of the season; nor can it be left for one solitary critic to discover the most beautiful building of the world.

The principle of bringing up the highest light against the deepest dark belongs to and pervades all art—sculpture, painting, music, poetry—and not only art, but all literature, even sacred literature—I mean Scriptural—does not dispense with it, but employs it as a means of touching the heart. We see the deep gloom of mournful complaint contrasted with pious resignation in the character of Job, which he expresses in that beautiful passage in the Burial Service: "Naked came I out of my mother's womb, and naked must I return thither; the Lord gave, and the Lord hath taken away; blessed be the name of the Lord." In architecture it is but a reflection of

external nature, on which this art is based. We see it in the bright myrtle, contrasted with the eternal gloom of the cypress, and in "the contrasts of fierce grief and wild joy in the nightingale's song."

In external nature it is again an image and type of our human nature, and our mortal lot, and points to its counterpart in the moral world, entering even into the structure of man himself.

> Dim miniature of greatness absolute!
> An heir of glory! a frail child of dust!
> Helpless immortal! insect infinite!
> A worm! a God! I tremble at myself,
> And in myself am lost!

And so of our mortal lot; we appropriately speak of the lights and shades of human life, where, it may be observed, that it is as variously distributed as in external nature and works of art. It is more grandly and broadly distributed in proportion to the rank or greatness of character.

Composition and light and shade are the most important parts of architectural design. Many of the greatest buildings of the world are, like the oratory of Demosthenes, unadorned; and the rest owe their impressiveness, not to their sculptural decoration, but to their great proportions and beautiful and harmonious forms—their graceful contours and provision for breadth of light and shade.

It is in this lies the power of architecture, and not in its sculptural ornament, or hair, like Samson's strength. Sculptural decoration belongs to the department of detail, and is analogous to diction in poetry and colour in painting, and cannot therefore be anything but a minor element of art, which seems to have been the impression of the greatest minds that have written on architecture—Goethe, Schlegel, Lamartine; the latter speaks of S. Peter's "swelling out in the proportions of a god," and designates it "an apotheosis in stone—a monumental transfiguration of the religion of Christ." "Pull down the pictures," he adds, "carry off the statues—it is still the house of God."

But there are other works—another class of works—besides those I have referred to, which will illustrate the principles I have endeavoured to point out to you. I might have called my tour a Tour round the Old World, or round the shores of the Mediterranean, for almost everything valuable and interesting in art and civilisation comes to us from those magic shores, if the buildings of men were all that the architect needed to study; but architecture being based on nature, an architect would make a great mistake if he confined his attention to human works, and did not closely observe how Nature carries on her operations; how she builds and buttresses her structures in foreground and background, in the mighty forests and the everlasting hills; how she varies and harmonises, unites and contrasts; how beautifully and skilfully she rounds and curves, and diminishes and increases, as varying circumstances require. The wise and discerning architect will observe all this, aware that the great and beautiful features of nature are all pregnant with suggestions of composition, and grouping, and combinations, and even details, and his note book will be filled with sketches and observations in reference to all these subjects, and calculated to aid him in his future designs.

I should advise the student to visit Switzerland as well as Italy, and to see the Pyrenees and Apennines and the peaks of the Alps, as well as S. Peter's and the Colosseum. Let him stand and watch some one of these, sloping away perchance in its many wild and beautiful forms, exhibiting here open healthy tracts, there deep glens, dark forests, and every feature that can attract the eye and the imagination. But among mountains I know of none, not Alps, nor Andes, that are so inspiring and instructive as our own celebrated Snowdon: not only fine and architectonic in its forms, but highly suggestive of composition and grouping, and other important principles and elements of design. Among other high artistic lessons it shows the importance and grandeur of solidity and depth in architecture, of the projection and recession of parts—of plane behind plane as an element of power. There is much in this mountain, viewed from Capel Curig, that reminds me of the Mahommedan buildings of India, as well as of the Egyptian temples. I allude, in reference to the latter, to the advancing works, spinxes, obelisks, colossi; and suggest that the architects of these took lessons from the natural objects in question, and confirm the lessons they impress. No architect can visit this Cambrian Parnassus, which, by the way, has several craggy summits, deep dells and moors and chasms, without being struck with the grandeur of Nature's manner of disposing her masses; or leave it without profound and lofty impressions and conceptions of the thoroughness, majesty, and perfection of the works of the Great Architect, as exemplified in this noble pile of nature, which gives the idea of what architecture should be completely to satisfy the eye and mind.

This is not all. There are important lessons in other departments of nature; as for example, that unity in variety—that oneness which is discoverable in the habits, mode of growth, and principle of construction of all the various members of the vegetable kingdom. Nor in these only; the animal kingdom is still more, perhaps, strikingly pregnant with instruction for the architect. The subject is too extensive to be entered upon here; but one very important principle I will just allude to that is strikingly taught in this department of nature—simplicity, or rather uniformity of construction. While the external forms of all the various animals are so different, it is very remarkable that the whole are, after all, variations of a fundamental plan which can be traced as a basis throughout the whole—the variations being merely modifications of that plan, to suit the particular conditions in which each animal has been designed to live.

I believe this should be aimed at in architecture; I believe in all great buildings it has been aimed at: I have been struck with the similarity in the plans and sections of all great buildings, temples and palaces, as in all great structures of animals, the vertebrate animals presenting everywhere the same general features; of which class of buildings the colonnade may be likened to the backbone; and, if so, astylar buildings will represent the mollusks or invertebrates.

In a general survey and contemplation of great edifices and styles of architecture, my strongest impulse is always to speculate on or scheme out what I conceive to be the utmost possibilities of architectural grandeur and expression, and what the future course of architecture is likely to be in England and among European nations generally. Michael Angelo's conception of architectural greatness was the enthronement of the Pantheon, which itself combined the two most graceful of classic features, the colonnade and dome, on the Temple of Peace, and it was a perfectly legitimate combination. The qualities of certain buildings combined in one would make the ideal of architecture; and the noblest and most perfect building would be one combining the chaste columnar beauty and elegance of detail and decoration—all that so captivates us in the Greek architecture, with as much as possible of the soaring composition of the middle ages. My own conception of the grandest possible style of architecture, or of that turn or modification of the Classic style applicable to great monumental works, is a combination of trabeation and arcuation, or a blending of the vertical and horizontal principles.

Than such a pure Classic style, by which I mean not a florid Italian, but a pure Greek or Græco-Roman style, I can imagine no style of architecture more suited to enshrine the pure simple worship of Christianity. No architecture expresses to me, or stands so well in my mind as a type of moral truth and purity, as these pure forms of an architecture in which purity and beauty of form give the charm and merit, independently of ornament. The beautiful volutes of the Ionic capital of the Erechtheium is to me a striking image of chastity or purity of soul. Freely treated, that is, combined with arch and dome, not Romanised, no style would produce a more truly solemn and sublime, and at the same time, perfectly adapted interior, than pure Greek architecture.

RENDERING HOUSES DAMP-PROOF.

ONE of the evils incident to civilised life is damp walls, and particularly in modern-built houses. But whether it exists in old houses or new, it is satisfactory to find that there is a remedy for the evil, and this one which we have reason to believe is thoroughly successful. It consists in the application of an invisible solution to the exterior brickwork or stonework of the building which seals up the pores and effectually excludes the entrance of any moisture after the application. This is the patented invention of Messrs. Gay and Co., of Alton, who have named it the "Invisible Process," because no change takes place in the appearance of the material to which it is applied. The method of application, which is carried out by special workmen, is as follows:—The face of the work to be preserved—whether of stone, brick, cement, or stucco, matters not—is first heated, so that all moisture is driven out and the pores of the material rendered fully absorbent. Whilst the walls are hot, a solution is applied consisting of a patented compound, which is dissolved by heat and payed on with a brush while hot. The air contained in the porous material being rarified by the heat, the solution is induced some distance into the pores, beyond what it would be if the natural porosity of the material were the only absorbent medium.

The nature of the solution is such that it is unaffected by atmospheric influences or by changes in temperature. It therefore combines a chemical with a mechanical action, and thus acts not only as a preservative from damp, but arrests decay, should that evil have set in, and in this respect it has a second and very special value. The invisible nature of the solution is very important, inasmuch as it admits of the preservation of objects which would be spoilt by the application of solutions not perfectly colourless and innocuous. Portions of a building, too, may be waterproofed, whilst other parts not requiring to be so treated may be left untouched, without causing any contrast in colour between the parts—or, in fact, any difference in appearance except that the parts treated look a little cleaner than the rest. We have a very absorbent brick by us which has been coated on one side with Messrs. Gay's invisible solution, the other having been left untouched. The coated side repels the water, nor will it enter if allowed to remain on it, whilst the untouched side absorbs water readily. From a number of testimonials before us, we find that this process has been applied very successfully in many bad cases of damp walls. One of the first buildings treated by Messrs. Gay and Co. was the house of Mr. J. H. Bowen, which is built of red brick, has a south-westerly aspect, and stands in an exposed situation on Chislehurst Common. Mr. Bowen states that he has not suffered any inconvenience from rain or damp since the process was applied, about a year since, and that during heavy rains he has observed the water streaming down the bricks instead of passing through them.

But the strongest proof of the efficacy of this process for waterproofing porous materials is to be found at the Alton paper mills of Messrs. Spicer. Here, a stone vat had been made for holding liquid paper pulp; it was 7ft. in diameter and 7ft. deep. Being of porous stone, the pulp found its way through in all directions, and much loss ensued. Attempts were made to remedy this defect by external applications of paint, but these failed, and Messrs. Gay's process was applied to the interior in August last. Messrs. Spicer write that since that time no moisture has penetrated the stone, although the pressure on the bottom and sides of the vat must, of course, be very considerable. Besides this, there are revolving arms or stirrers inside the vat which are continually in motion, keeping the pulp agitated. These are strong proofs of the durability and efficiency of the process.

The foregoing process, it will be seen, requires skilled workmen to apply it, and is chiefly applicable to brick, stone, stucco, and similar materials. Messrs. Gay, however, have another waterproofing material which, besides being applicable to the above substances, is especially suitable for wood and iron-work. This is their impenetrable paint, which is visible after application, being made in various colours, and laid on after the manner of ordinary paints. It differs from these in appearance, inasmuch as when dry it presents a hard, enamelled surface, the colours coming up very bright. It is, however, waterproof and impenetrable to damp, and remains unaffected by either solar heat, frost, or salt, either in the walls or in sea-water. It possesses such rapid drying properties that three coats may be applied within an hour, and although so quickly applied, it is an efficient waterproofer, and its appearance remains unchanged, as testimonials show.

We thus have two methods of preventing and curing damp walls, one invisible and the other visible, both of which have had the test of practical use successfully applied, and which appear well suited to accomplish the purposes for which they are designed.

MR. BARRY AND MR. AYRTON.

THE line of conduct recently adopted by the First Commissioner of Works towards Mr. Barry will, we hope, have one good effect —namely, to awaken that hitherto rather lethargic body, the Council of the Royal Institute of British Architects, to the necessity for decided and active measures in support of the rights of the profession. The general meeting summoned to consider the question on Monday evening last showed many signs of a vigorous awakening which we sincerely hope will not pass off without some permanent good being accomplished. At the same time, it was remarkable how little confidence the older members seemed to have in the principles they had themselves so often enunciated from the presidential chair and elsewhere; and but for the vigorous determination showed by some of the younger members, the whole question now raised by Mr. Ayrton as against Mr. Barry's rights would be surrendered in despair. For instance, as all our readers know, this question was fully debated, and, as one would suppose, settled by the paper of Professional Practice published in the year 1862, which distinctly states that, by the usage of the profession, the client is only entitled to the use of the drawings prepared for a building, and that they remain the property of the architect. Now, it can hardly be necessary to inform any one possessing even the most rudimentary knowledge of British law that the custom and usage of any particular trade or profession will be held to be binding on all who employ parties practising that particular profession, as well as on those whom they employ. If we employ an auctioneer, solicitor, or stockbroker, to transact business for us, we do so subject to the usages of those particular professions, and why should it be otherwise with an architect? Those who wish to see the law clearly defined to this effect will find it in the well-known treatises on the law of contracts by Addison and Chitty, under the head, "Custom and Usage," and the principle furnishes a remarkable illustration of the maxim, "Common law is common sense." Up to the present the leading men of the Institute seem to have well understood this principle, and we do not know why they should now be afraid to test its soundness. For example, Professor Donaldson, in his presidential address published in 1864, referred to the paper of professional practice as follows:—"The table of the Institute has been accepted by legal men in the metropolis, and quoted in the courts as an authentic document drawn up by the heads of the profession, and as authoritative in settling such questions of professional usage, and as mutually binding on employers and employed." Also, in the year 1868, we published a resolution adopted by the Council advising the members that the "usage as defined in the Institute paper was undoubtedly the law on the subject." And certainly so it ought to be. If it be not so, the Institute paper is a worthless and fraudulent document, and the Institute, in publishing it, has simply attempted to mislead and impose on the public. There is no middle theory. Either the paper in question is an honest and true statement of the usage "binding on employers and employed," or else it is a cheat and imposture, and ought at once be rescinded. We ourselves are strongly of the former opinion, and, because we are so, consider that the usages in question should be maintained simply as rights, and not as courtesies which may or may not be conceded.

We can fully sympathise with Mr. Barry in the course adopted by him in his correspondence with Mr. Ayrton of resting his claims on the broad grounds of their reasonableness rather than their legal force, endeavouring as he does to convince by argument, and even conciliate by concession. There is a remarkable contrast between his letters and those of the Department, one set being lengthy and courteous, and the other invariably short and sharp. We very much fear the courtesy and conciliation have been quite thrown away, and that Mr. Barry in future would do well to adopt the tactics of his opponents, and simply decline to accede to the illegal and unreasonable demands made upon him, leaving it to the other side to take what measures they may think fit in order to coerce him. "Possession is nine points of the law," and until Mr. Ayrton and his coadjutors can prove that by the terms of their contract with the late Sir Charles Barry and his son, the Government became the purchasers of their drawings, as well as of their services, Mr. Barry cannot be compelled to part with the documents. We are glad to see that Mr. Barry is not likely to be left to fight the battle alone; and we opine that, by taking firm and decided ground, the question will not have to be fought at all, but will be conceded in his favour, as the same question hitherto has been, as a matter of undoubted right.

In the course of the discussion a good many facts relating to legal contests in defence of professional rights were quoted, and one statement in particular made which does not redound much to the credit of the past governing body of the Institute, and which certainly ought to receive further attention from the present Council. It would appear that the question as to the validity or otherwise of the Institute document was brought for trial under very favourable circumstances not long ago, and with every reasonable prospect of a successful issue, which would have settled the question for all future cases, when a member of the Institute gave evidence directly against it, causing thereby a disagreement of the jury, who very naturally found it impossible to decide questions for architects on which the latter are still undecided themselves. Surely a case of this kind demands a thorough investigation on the part of the Council; and so long as it remains undecided how can any better result be expected in any other case in which the same principles are involved? The public will never put any faith in the resolutions or publications of a body which, to use a familiar phrase, "does not know its own mind," and which, having issued a code of practice as "authoritative and binding on employers and employed," permits its own members to contradict and resist the operation of that code without deeming the matter worthy of further notice. It has not been in this way that the other liberal professions have succeeded in maintaining their usages and forms of practice, and it is time that the Institute of Architects should take similar firm ground in defence of the rights of a profession which ought to be second to none. On what principle can the members of the body be said to be united if it be not for the maintenance of a uniform and respectable system of practice, and how can this ever be attained when members can publicly appear in flat contradiction to each other, not on abstruse points of science or taste, but on the most elementary principles on which the practice of their profession is to be conducted?

Our sympathies are fully with Mr. Barry, and we sincerely trust that he will be able to make good his position against the arbitrary and dictatorial measures by which he is threatened; and we hope the day is not far distant when controversies of this kind, always painful and harassing, will become practically impossible. The Institute has done a good deal towards the accomplishment of this end we willingly admit, but the cases above referred to show that something more requires to be done.

W. F.

MR. BARRY AND THE CHIEF COMMISSIONER OF WORKS.

ON Monday last the Royal Institute of British Architects amply discussed the matter in dispute between the First Commissioner of Works and Mr. E. M. Barry. After full consideration, it was unanimously resolved:—

1st. "That it is fitting, and indeed necessary, for the worthy maintenance of national monuments and buildings, that they should be always under the superintendence of professional men of independent position and high standing, who have been specially educated as architects.

2nd. "That the custom of the profession has uniformly been that the ownership of Drawings and other documents prepared for the execution of buildings has rested with the architects employed.

3rd. "That a copy of the above resolution be forwarded to all the members of both Houses of Parliament, and that the widest possible publicity be given to the same.

4th. "That a Committee be appointed, to consist of the President, Vice-Presidents, the Council, and such other members of the Royal Institute of British Architects as the Council may deem fit, and that this Committee be authorised and requested, on the part of the said Institute, to support and to urge upon her Majesty's Government, either at interviews, by correspondence, or otherwise, the views expressed in the previous resolutions, with the power to convene future special general meetings for further consideration of the subject whenever they may see fit.

5th. "That a vote of cordial sympathy with Mr. E. M. Barry be communicated to that gentleman.

6th, "That he be encouraged by the expression of such sympathy to resist to the utmost the unprecedented demand made upon him; and that, in the event of expenses being incurred in reference thereto in trying at law any questions which may arise between himself and the First Commissioner, this meeting pledges itself to promote the raising a guarantee fund for the same."

A special Council Meeting of the Royal Institute of the Architects of Ireland to take the subject into consideration has been held. Strong sympathy is felt by the members of the profession in Ireland for Mr. E. M. Barry, and the Irish Institute is anxious to co-operate with their English brethren in resistance to this or any other encroachment on an uniformity of practice heretofore by well-established custom existing in the profession on both sides of the Channel. It was stated that the rule of the Irish Institute with reference to the architects' property in plans was identical in expression with that of the rule of the Royal Institute of British Architects issued in 1862, having been adopted by the Irish Institute in 1863.

LABOURERS' COTTAGES.

A SHORT time since we reviewed "English Country Houses," by Mr. Wilkinson, of Oxford, and we alluded to some designs for cottages which the book contained. One of our page illustrations this week shows two of these cottages, with ground floor and bedroom plans. The first is a labourer's cottage at Launton, Oxfordshire, built for F. J. Staples-Browne, Esq., and the other is a labourer's cottage at Steeple Aston, in the same county, built for the Rev. J. B. Brooks. The first of these plans provides two bedrooms only, the second three bedrooms. The walls are of local stone, and the roofs are covered with blue slate. They are provided with the usual out-offices. It must be admitted that they are both simple and picturesque.

BURGLARIES.—Anent the recent burglaries and attempts at burglaries on shops, Mr. Ernest Turner, M.R.I.B.A., writes, offering a few remarks. That the safest of all methods would be the universal use of iron bars in lieu of shutters, and to keep a light burning all night, is, he thinks, now generally admitted, and he urges all about to build or alter to adopt this principle; but, as it cannot be expected that all whose premises are at present protected by shutters will incur the outlay necessary to substitute the iron bars, he calls attention to the fact that by far the larger proportion of shop-shutters in London are now painted a dark colour, thus absorbing the light from the street lamps; whereas, if light colours, say stone colour or light buff, were generally adopted, the light would be reflected, the appearance of the streets when the shops are closed greatly improved, and as in the principal business thoroughfares the light would be doubled, the opportunity afforded to marauders to escape observation would be proportionately diminished. As a matter of social economy this plan must commend itself to the public, as without outlay, it is equivalent to double the number of street lamps, or a considerable augmentation of the police force.

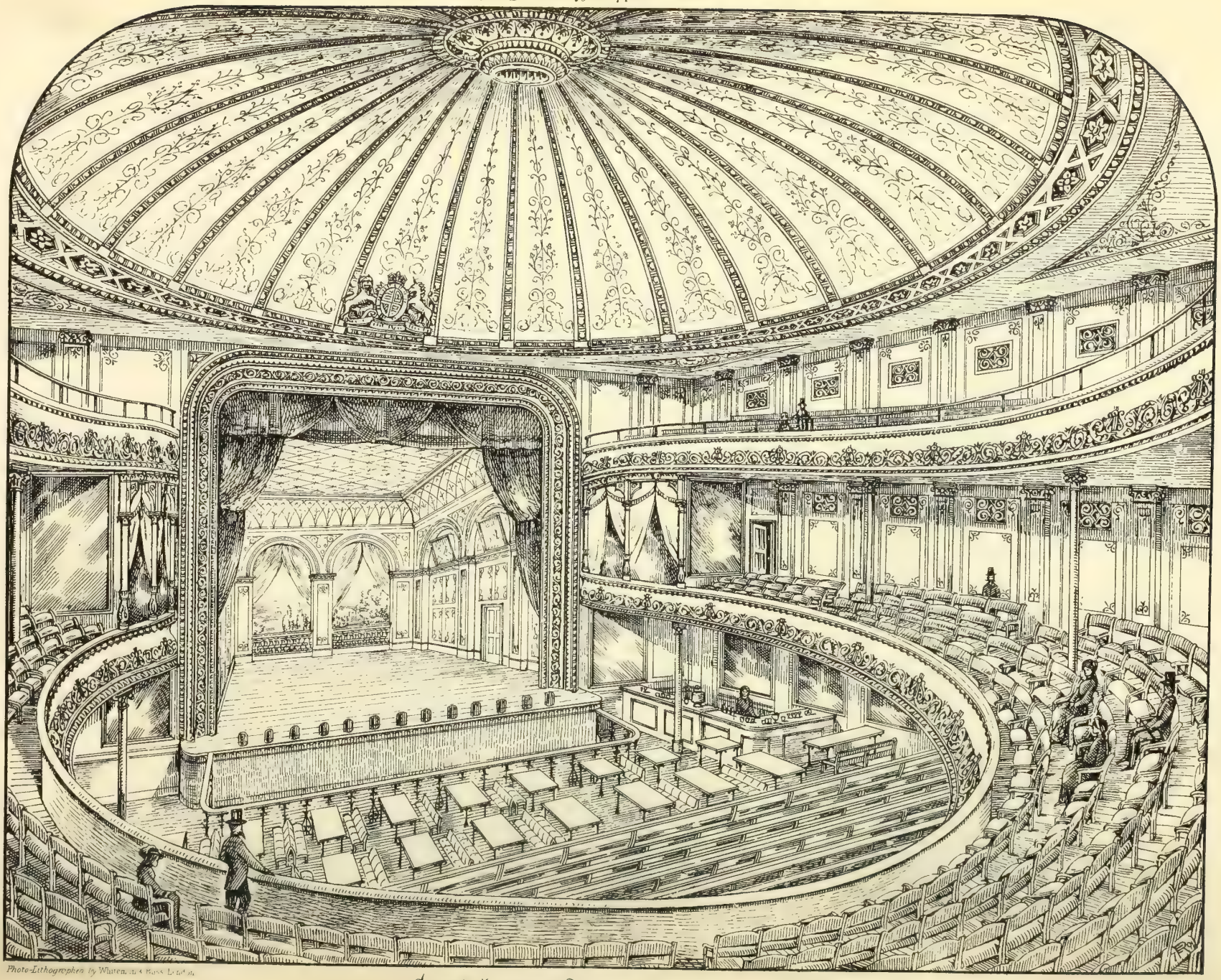


Photo-Lithographed by Whitehead & Rose, London.

South London Palace.—WILLIAM PAICE, ARCHT.

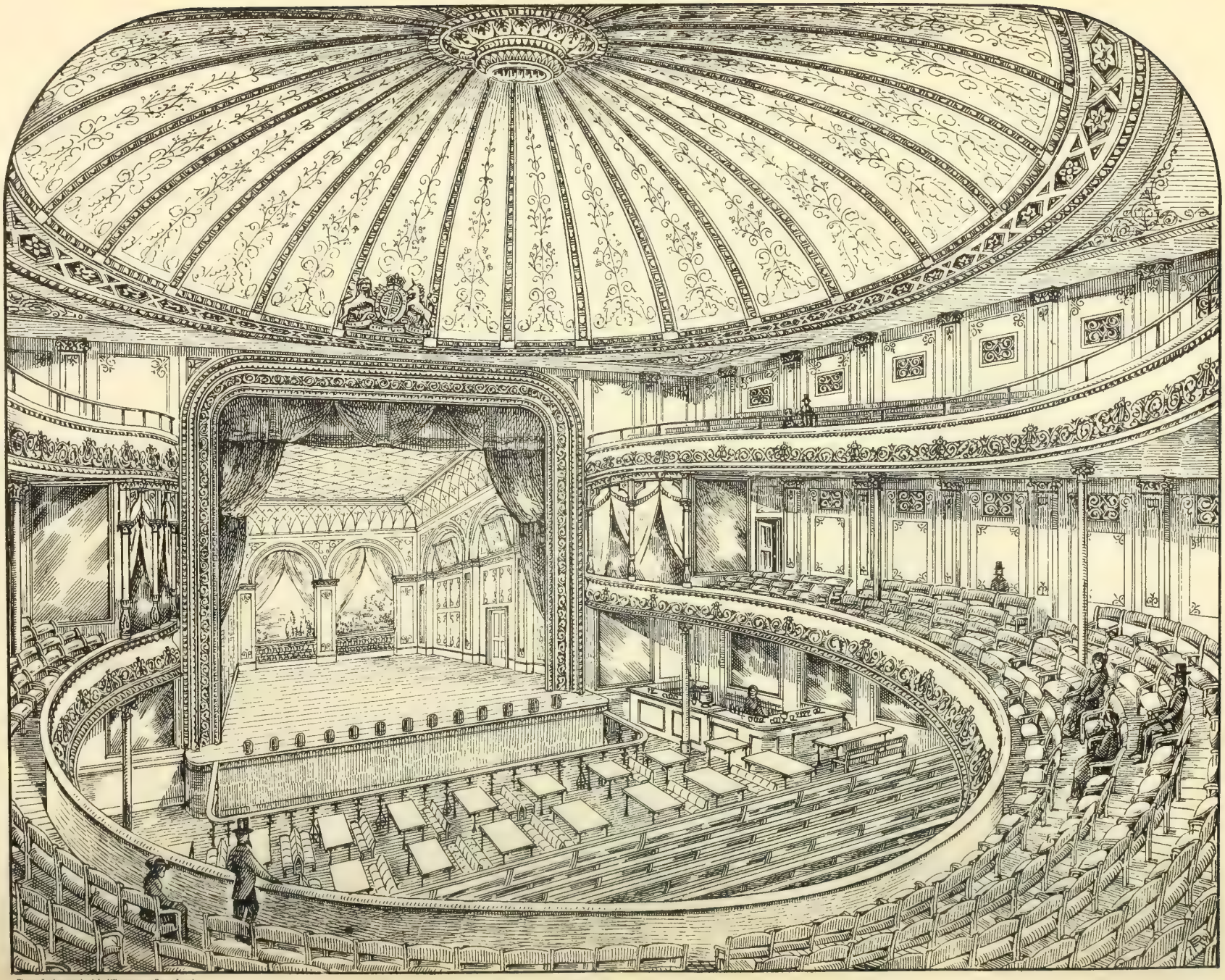
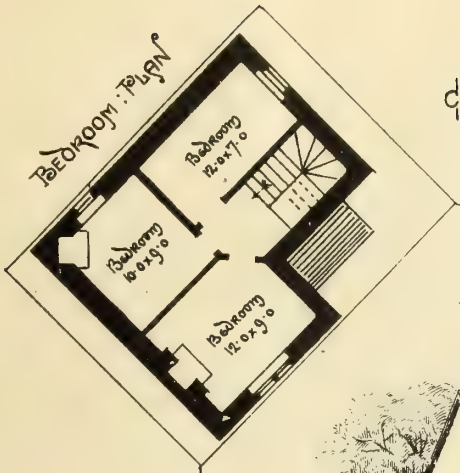


Photo Lithographed by Whiteman & Bass London

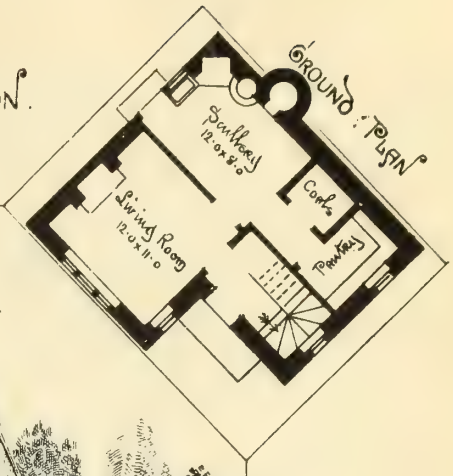
South-London-Palace.—WILLIAM PAICE, ARCHT.

Cottage at Steeple : Aston.

Oxfordshire



Bedroom : Plan



Ground : Plan



Scale of Plans 16 feet to one Inch

W. Wilkinson, Archt. Oxford.

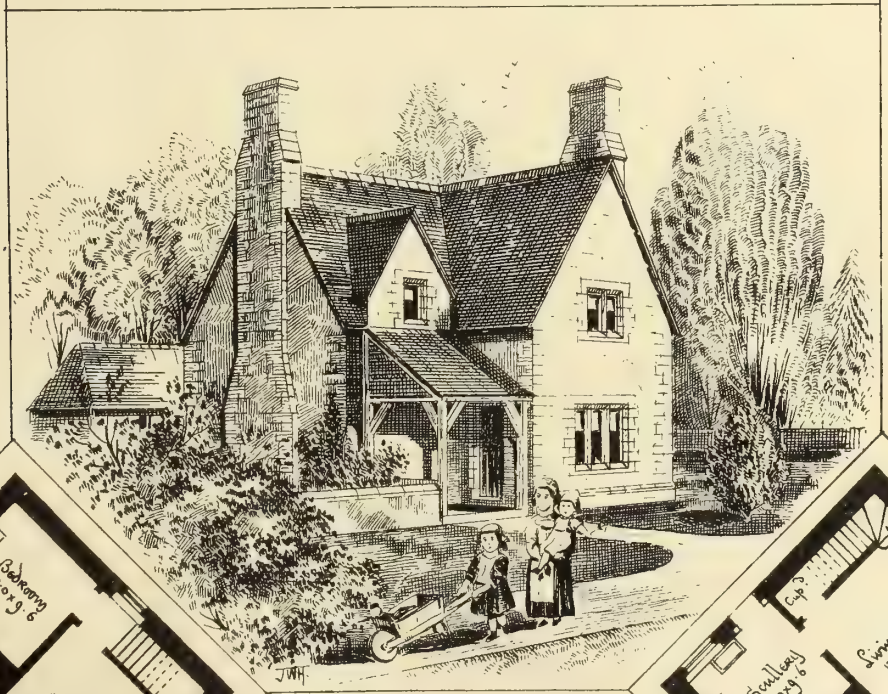


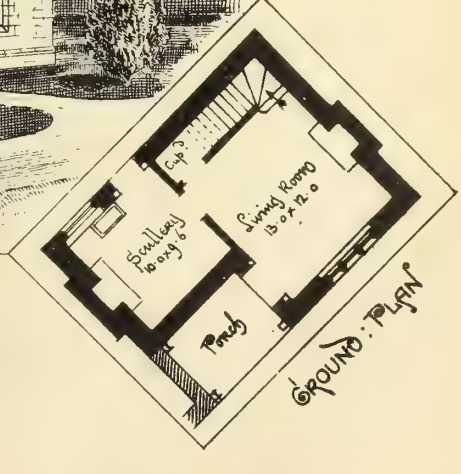
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Cottage at Launton

Oxfordshire



Bedroom : Plan

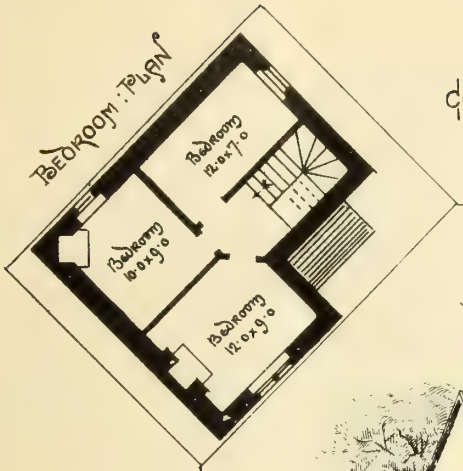


Ground : Plan

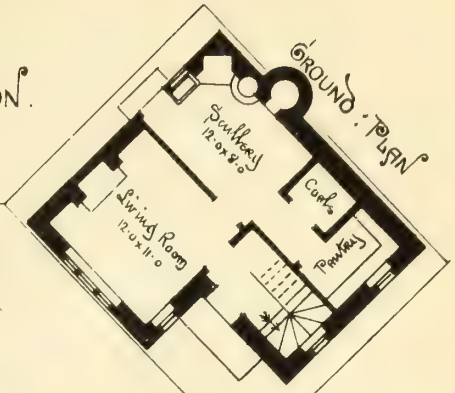
COTTAGE AT STEEPLE : ASTON.

OXFORDSHIRE

BEDROOM : PLAN



GROUND : PLAN





Scale of Plans 16 feet to one Inch

W. Wilkinson, Archt. Oxford.

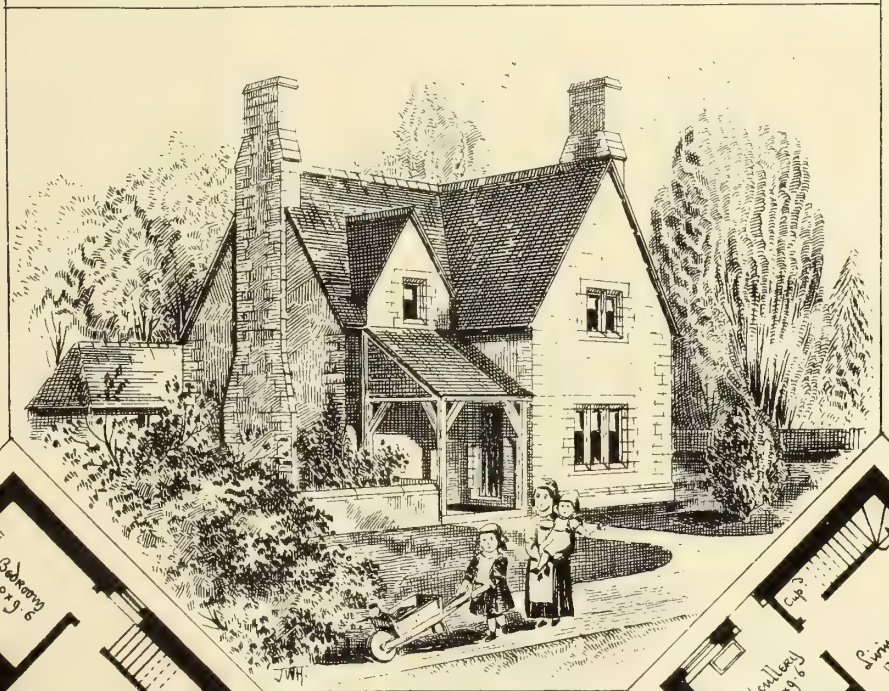
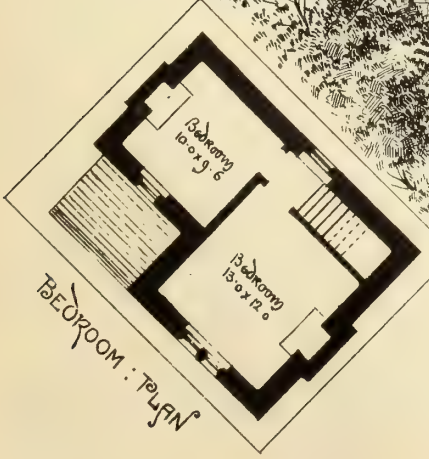


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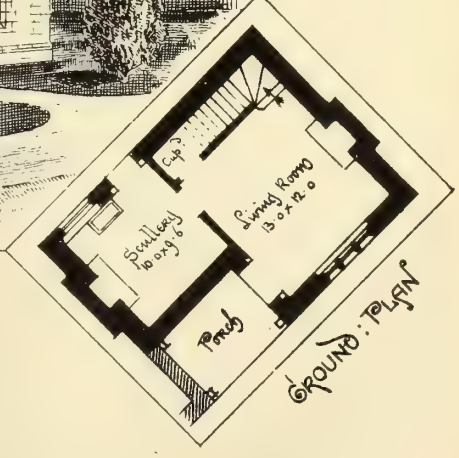
COTTAGE AT LAUNTON

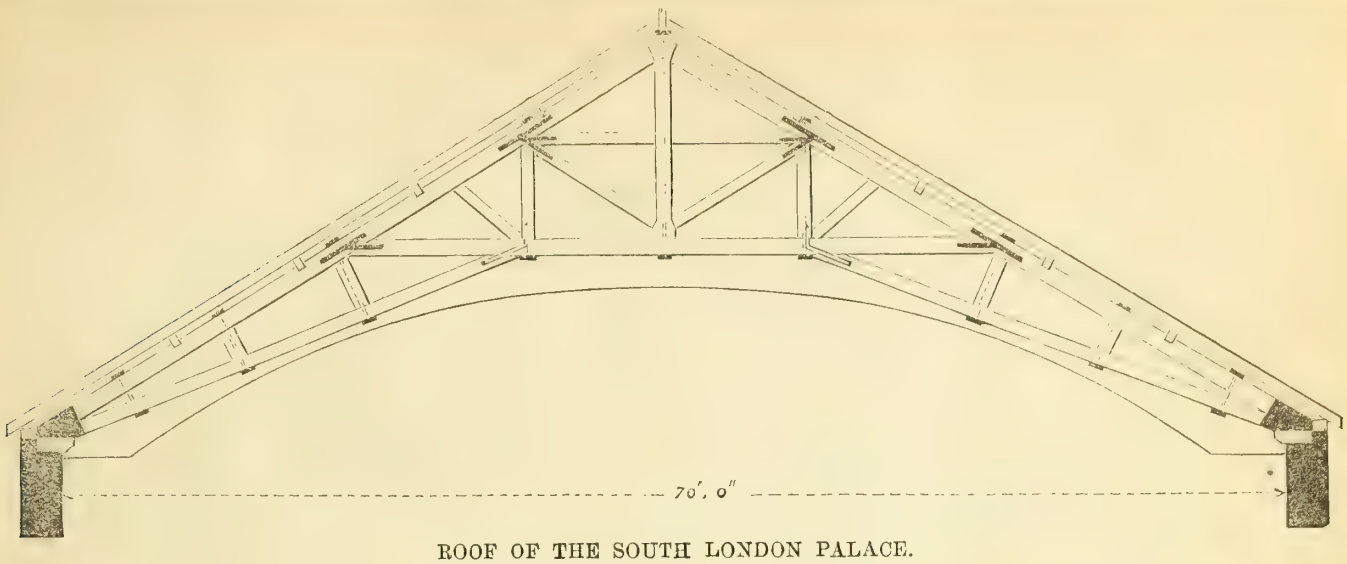
OXFORDSHIRE

BEDROOM : PLAN



GROUND : PLAN





ROOF OF THE SOUTH LONDON PALACE.

THE SOUTH LONDON PALACE.

THE South London Palace, situated in the London-road, Southwark, has been erected on the site of the old South London Music Hall, which was destroyed by fire last summer. The present new building, in addition to the old site, covers considerably more ground, which was obtained by the demolition of some of the surrounding houses. The inside measurement of the new building is as follows:—120ft. long, 70ft. wide, and nearly 50ft. high.

The stage which is erected at the south side, and is nearly the whole width of the building, has beneath it a space of 20ft. deep to receive and produce scenic effects. The style of the building is Italian. The pit and stalls are on the ground floor, the private boxes and balcony on the second floor; each of these floors is unusually lofty. The hall is capable of holding 4000 persons. The orchestra, which is 30ft. wide, will hold 40 performers.

The principal entrance to the building is by a wide corridor leading from London-road, at the end of which separate entrances are obtained to the pit, and to the stalls. The balcony floor is approached by a spacious stone staircase, which is also continued to the gallery floor above so as to give additional egress from the gallery in case of fire. The gallery is approached from London-street by an easy stone staircase, there are no winders in any of the staircases. The pit, stalls, balcony, and gallery are each provided with large and separate refreshment bars. For the accommodation of the officials of the establishment an iron spiral staircase runs from the pit to the gallery, thus giving an immediate connection to the three principal refreshment bars. The pit, stalls, balcony, and gallery are each provided with lavatories, water-closets, and urinals. There are also private rooms on each floor for ladies. For the facility of the officials there are private stairs from the several floors to the stage.

The auditorium of the hall is covered by a dome 65ft. diameter, which is effectually ventilated by perforated enrichments, and is provided with an elaborate sunlight. In the roof immediately over the dome is a large ventilator; there are additional ventilators in roof over stage and gallery.

The architect has taken great pains in the general construction of the building. The ventilation, which is unusually good, is obtained (in addition to the perforations in the dome) by series of window openings between the pilasters on each floor (upwards of 70) which openings are filled in on the outside with glazed casements hung on centres with lines, and filled in on the inside with perforated enriched plaster panels. All the lavatory departments have external ventilation.

One feature in the construction is the novelty of the roof, which is 70ft. span, the portion over the dome being carried by what might be termed collar principals in lieu of the ordinary tie beams, so that by this means an additional height of 9ft. in the dome is obtained in the roof, thereby saves the same height in the walls, by which, considering that additional height would necessitate extra thickness in the brickwork, the saving is very great (see illustration). Considerable trouble has been taken in the levels of the separate floors, which have been so arranged that every person has an uninterrupted view of the whole of the stage, even to the sides of the gallery in which the audience are seated as far as the proscenium.

Unlike most houses, the architect has resorted to the use of a very few columns, which are always objectionable as an obstruction to the view. Although the entertainment of the establishment is that of a music hall, the building is to all intents and purposes a theatre.

The decorations, which are from the architect's drawings, are principally the grape vine foliage, and are very bold, and have a rich and imposing appearance. The sound throughout is admitted by all to be a great success.

The foundation stone was laid last autumn by Stanley Vickers, Esq., M.P., and completed and opened to the public in thirteen weeks, from designs prepared by and under the superintendence and immediate control of Mr. William Paice, architect, Adelphi Chambers; Messrs. Langmead and Way were the builders.

PARLIAMENTARY NOTES.

Opening of Public Museums after Dark.—On Friday last Mr. Allen's request that the House should express an opinion that the National Gallery and certain portions of the British Museum ought to be opened between seven and ten o'clock in the evening at least three times a week, was met by Mr. Walpole and Mr. T. Baring, as trustees respectively of the British Museum and National Gallery, with the assurance that these buildings could not be lighted up without incurring a serious risk of fire, or at all events of causing damage to the collections which they contained. At the same time the member for the University of Cambridge informed the House that during the summer months the British Museum is to be opened on Saturday and Monday between the hours of noon and half-past eight o'clock in the evening.—The Chancellor of the Exchequer fully recognised the danger of attempting to light the existing buildings with gas; but he held out a hope that when the new National Gallery shall have been erected—which he trusts will be sooner, rather than later—and the Natural History Collection shall have been housed in a new building quite apart from the existing Museum, it may be possible to make arrangements for the exhibition of that collection and of the national pictures after dark; and this intimation was so satisfactory to Mr. Allen that at the close of a brief discussion he withdrew his resolution.

The Dismissal of Mr. Edward Barry.—Mr. Cowper-Temple gave notice that on Friday next (to-day) on going into Committee of Supply, he will call attention to the dismissal of Mr. Edward Barry as the Architect of the Houses of Parliament, and that he will conclude with a motion.

The Decoration of the Central Hall.—Mr. A. Seymour on Monday, in reference to a question on this subject, said that he had addressed it to the right hon. gentleman the Prime Minister because of the customary want of courtesy on the part of the right hon. gentleman the member for the Tower Hamlets, his habitual evasion of questions, and nonchalance.—The Speaker, interposing, informed the hon. member that he could not, in asking a question, express any opinion.—Mr. Seymour then asked the First Lord of the Treasury what instructions had been issued to Mr. Poynter with regard to the decoration of the central hall, and whether the cartoons exhibited by that gentleman at the Royal Academy's Exhibition were to be returned.—Mr. Gladstone said that he understood that Mr. Poynter had been promised that he should be employed in decorating the central hall, but he had been requested by the First Commissioner of Works to await the decision, which had not yet been arrived at, as to the method of carrying into effect the designs contemplated. The cartoons alluded to were the property of the Government, and could not be permanently returned to Mr. Poynter. They would be employed for some public purpose.

Model of the Embankment.—In reply to Lord Elcho, Mr. Ayrton said that the model of the Thames Embankment he had asked for some time before Easter had been for some days in the very room in which he asked it should be, but that room being required for other purposes, it would have to be removed to another.

LAMBETH SCHOOL OF ART.

THE annual meeting of the students and friends of the Lambeth School of Art was held on Monday evening at the School-house, Miller's-lane, Vauxhall; the Rev. Canon Gregory in the chair. The Bishop of Winchester had kindly consented to deliver an address in relation to art; and there was a numerous attendance. The Bishop of Winchester, who was warmly received, commenced his address by expressing his belief that the Lambeth School of Art might be, and ought to be, productive of much benefit to the industrial classes of the district, if properly appreciated and supported. It was usually supposed that art consisted only of painting and sculpture; but he gave it a wider range. The writer, the dramatist, the preacher, were all artists in their respective spheres, although they worked with different instruments from the sculptor and the painter. Art was the power of reproducing nature in a truthful sense. High art was the production of a thing which interpreted to every man his own thoughts and actions. Patience, taste, and the love of truth and beauty in nature should be the aim of all art pupils who desire to become artists in the highest sense of the word. The Rev. Canon Gregory distributed the prizes to about thirty students, amongst which were the gold medal to Cyrus Solomon for a life study, and a silver medal to George Brookes for a model from the antique. The other prizes consisted of bronze medals, books, and certificates. Mr. Cressy, Mr. H. Doulton, the Rev. Mr. Carnes, Mr. Sparkes, and others addressed the meeting, after which the proceedings concluded with a vote of thanks to the Bishop for his address, and to the chairman.

Furniture & Decoration.

THE THEORY AND PRACTICE OF MODERN HOUSE DECORATION.

By an Experienced Workman.

ON THE NATURE AND USES OF THE OILS, VARNISHES, DRIERS, &c., USED BY THE HOUSE PAINTER AND DECORATOR.

(*Continued from page* 336.)

As to the reason of varnishes cracking, we certainly think that it is sometimes the fault of the varnish, but in the majority of cases it is a consequence of improperly-prepared grounds. It is generally believed by artists that when a picture is varnished and afterwards cracks, it does so because it has been varnished too soon after being painted. We do not think this is the reason; all experience goes to prove the contrary, especially as regards the use of varnishes by the house painter. As we have before said, the house painter is compelled to proceed to varnish his work in course of a few days after its being painted, and if painted work of any kind cracked because it was varnished too soon after painting, all his work would crack, which is not the case—in fact the work that does crack is the exception, and not the rule; therefore we must seek for some other cause. As regards house painting this cause is not far to seek. In many cases it arises from the use of glutinous sizes, technically called clearcole, a mixture of parchment size or glue size and whitning and water; in many cases this is done to save a coat of paint, in other cases because it makes the successive coats of paint bear out more uniformly and evenly. In other instances it is used to fasten on the dirt and kill the grease, so as to make the paint dry, instead of washing off the grease and dirt before painting with soda and water. In every case when size is used it is detrimental and injurious to the work; the inevitable result must be either that the paint cracks in consequence of the changes in the weather affecting the size and the oil paint unequally, or in wet weather causing the size to give and the paint to peel off, or in hot weather to split up into thousands of cracks. The heat that softens the one shrivels up the other; these opposing influences soon tell, and the work suffers. Another fruitful cause of grounds cracking is their want of tenacity. In consequence of being mixed without a sufficient quantity of oil or varnish to bind the ground colours together, successive coats of dead or partly dead colour become in time too dry—that is, what little oil they contain is dried up, and the particles of lead have no cohesion; consequently when the work is repainted with oil colour or varnished, the contraction of the new paint or varnish in drying and hardening cracks the ground. In certain situations where the sun has had much power, we have seen work cracked to a depth of one eighth of an inch to the wood from this cause alone; in these cases there is no remedy except cleaning off the paint from the wood, which may be accomplished best in the following manner, viz:—mix common washing soda, with freshly slaked quick-lime in the proportions of about two pounds of soda to a bucket of lime, the soda and lime when mixed having the consistency of thick cream; or it may be used stiff so that it will spread on the paint like plaister. Spread this mixture over the paint to be stripped, taking care to keep the whole moist for one hour; if the composition is properly manipulated, the whole of the paint will wash off the wood and leave it quite clean, like a new door; its chemical action being to turn the oil in the paint into soap, and the rest becomes mere mud. The work should then be well washed with plenty of clean water, to remove any of the lime which may remain; then it should be allowed to get perfectly dry before being again painted; when dry, the wood may be well smoothed with glass-paper. Another fruitful cause of varnish cracking, especially on work that has been grained in imitation of wood in distemper, is the strong gluten contained in the beer the grainer uses as a vehicle. Most persons are aware that if beer is spilt upon a table, or a small quantity is left in a glass to dry up, it becomes viscid and sticky like glue. It is this stickiness or binding quality that makes it so useful in distemper graining. No substitute has yet been discovered so suitable for the purpose, but if it is used for graining in its full strength as sold in the shops, it will inevitably crack almost any varnish; in fact, its power of contraction is so great that we have seen work covered with millions of minute cracks from this cause both before and after the varnish has been applied. We have always found it the safest plan to dilute the beer with water, fully two-thirds water to one-third of beer. When used in its full strength, if it does not crack it will be sure to injure the polish of the varnish. Varnish is also injured by using coarsely-ground graining colours. Graining colours should be used as finely ground as possible. Polish or lustre results from smoothness and evenness of surface, consequently everything which tends to roughen the surface to be varnished detracts from its brilliancy. Too much distemper colour on painted work injures the varnish by absorbing a portion of its body.

All varnishes should be kept carefully excluded from the air in closely-corked bottles to prevent evaporation, which thickens them and causes them to become fat. When varnishes have to be used on old work, it is a common practice to clearcole the work previous to varnishing, in order to make it dry. This is a bad practice; the best and safest plan is to wash the whole of the work to be varnished with a weak solution of common soda in water. If the work is well and carefully washed, we will guarantee that the varnish will dry well and bear a better gloss than if clearcole is used. This method, of course, clears off all dirt and grease, and we always adopt it for all work that has to be repainted or revarnished, and never knew it to fail in causing the paint to dry.

The manufacture of varnishes and siccatives or driers is a branch of industry in which a trade secret is worth thousands of pounds, success often depending upon the minute observance of certain mixtures and certain processes which can only be arrived at by long experience. The points of detail thus learned at the price of many costly failures is not likely to be lightly divulged for the benefit of others. There are, of course, hundreds of receipts published describing how to make almost every kind of varnish, most of which are mere nonsense. The directions given, if strictly followed, will, in ninety-nine cases out of a hundred, lead the would-be varnish maker into difficulties and expense without producing any adequate result. There are several simple varnishes which are made by merely putting the gum or resin into a suitable spirit to dissolve, and thus the varnish is made. This class of varnish is scarcely ever used by the house painter, and therefore need not be described here. Oil varnishes (that is, varnishes in which linseed or other oils form a component part) require manipulating by heat and by various processes, a knowledge of which can only be acquired by long experience, totally out of the reach of the amateur.

It is no use going back to the description of varnish making anterior to 1851, because such vast improvements have been made since that time in the processes used in its manufacture, so many new gums have been brought into the market and utilised in the making of varnishes, that old methods have been superseded by new ones, and all the resources of modern chemistry have been brought to bear upon the subject; and the manufacture has become of so much importance, consequent upon the increased demand, that old processes have become almost obsolete, and we have been credibly informed by the scientific partner of one of our most extensive varnish manufacturing firms that where they manufactured tens of gallons in 1851 they now (1870) manufacture thousands of gallons. We can well believe this to be a fact. The decorative arts received a powerful impetus from the Exhibition of 1851, which has been spreading ever since, and that event might with some propriety be called the Renaissance of decorative art in England. Our researches and inquiries into the recent improvements which have been made in the manufacture of varnishes have not been very successful; we confess we are just in the same position in this matter as the reporter in this class for the jurors of the Exhibition of 1862, Mr. A. M. Hofmann, the eminent chemist, who says in his report on varnishes, that the information he did obtain was not that which he wanted—and the information he did want he failed to obtain. We had hopes of being able to state what improvements had been made, how they were effected, &c., &c., but unfortunately trade interests stood in the way, and with regret we have to acknowledge our defect—however, this is not so much to be deplored in our case, inasmuch as we are treating more particularly of the uses of varnishes than of their manufacture. Much valuable information on the manufacture of varnishes may be attained from a paper read before the Society of Arts, by J. Wilson Neil, vol. xlix., p. 33, of the transactions. Also from a work on varnishes by the eminent French chemist, Mons. Chevernil. Consult also a small work by P. F. Tingry, of Geneva. None of these describe what may be called the new processes, but no doubt many valuable hints may be derived therefrom.

Of siccatives or driers, we have several, their use being to force paint to dry quickly, in situations where quick drying is a necessity, and also to cause bad-drying pigments to dry or harden. Their use in all delicate colours or tints should be avoided when possible; their tendency being to darken and discolour them. If used with white they turn it quickly to a dirty yellow. If with tints of delicate blue, they turn to a dirty green; and, in fact, destroy all pure tints. The principal siccatives or driers are sacrum, or sugar of lead, litharge, manganese, patent driers and terebine or liquid driers. Sugar of lead is a good and safe drier, and is used principally by artists, and for the more expensive colours used in house decoration. Litharge is not much used in its pure state by the house painter, but we remember the time when it was his principal drier, and was kept in powder and ground as required. Patent driers is a compound of various substances in the form of a thick paste; and until recently was used for all kinds of paints. There are many objections to its use, amongst which are its want of body; when mixed with paint it increases its bulk without adding to its body, and therefore the paint will not cover as well. Of all driers it is the most effective in its power of discolouring light tints and colours; in fact, if the driers are left uncovered with oil or water, and exposed to the air, a thick dark skin or pellicle will immediately form on its surface. If too much driers is mixed with paint, it has a strong tendency to crack. Patent driers varies so much in power and quality, that no strict rule can be given as to the quantity it is safe to use to any given quantity of paint; but if the patent driers is really good and free from adulteration, half an ounce of driers to one pound of paint will be quite sufficient for all purposes, but we prefer to use less when we do use it at all. It should always be used carefully and sparingly, and never used except as a necessity.

Terebine or liquid driers is a recent invention. As a drier it is far superior to patent driers, and is free from many of the objections to which the use of that article is liable; its power of

discolouration is not so great, and it will mix with paint without impoverishing the body of the paint: a very important quality this. It is also very useful in forcing slow-drying varnishes to dry quickly when it is required, drying and hardening them without injuring their brilliancy. When mixed with varnishes from which the spirit has evaporated, and which have become fat or too thick to work, it will restore them to a working consistency without injuring their body or brilliancy; but we would here give a caution as to the too free use of this drier; its power is so great, that if too much is used in proportion, it will shrivel up the paint or varnish as if it had been burnt or scorched with heat; if the drier is really genuine, about a quarter of an ounce to a pound of paint or a pint of varnish is quite sufficient, except it is required to dry extra quick, then three times the quantity may be used with safety. These quantities of course only refer to the best article. Every varnish manufacturer makes what he calls liquid driers, many of which are mere shams and almost useless. We have tried many, but have not yet found any equal to that made by, we believe, the original inventor, Mr. Edward Powers, of Coventry. In mixing this drier with paint or varnish, care should be taken to keep them well stirred while mixing.

Erratum.—For "siccatines," read "siccatives," in last number.

ON THE PROGRESS OF ART, AND THE PROBABLE CAUSES OF THE GREEKS' PRE-EMINENCE IN ITS PRODUCTION.*

By H. C. Selous

It is the opinion of many that the impression made on us by the personal attraction to which we give the name of "beauty" is but a matter of individual idea—that it merely lies in the imagination, and that there are no fixed rules for determining what should or should not be considered as the perfect form of the human face or figure. In support of such opinions it is advanced that there is an infinite variety of form and feature scattered throughout this earth, and that every variety may and does have its individual admirers. Doubtless such is the case, not only on this subject but on every other. If we all thought alike there would be stagnation of mind, and no improvement. In his primeval state man was placed upon this earth and entrusted with ample powers to carry out and, in the fulness of time, to bring to perfection the wondrous capabilities of that divine gift the human mind, as, in the words of our great dramatic teacher Shakespeare, when he tells us

> Sure, He that made us with such large discourse,
> Looking before and after, gave us not
> That capability and God-like reason
> To rust in us unus'd.

Let it be the care then, of everyone to strive to assist in this great work allotted to us. Diversity of opinion leads to discussion, discussion to exercise of thought; we gain in knowledge, and eventually arrive at truth. Man is formed on the principles, and partakes in his nature and is a part of the animal creation, but with the impress of his Divine Maker stamped upon his lordly brow and upright stature he stands at the head of his class, pre-eminent in form and feature—the intellectual embodied perfection of animal life. Can we then for a moment doubt the existence of a standard whereby to judge of this perfection? Diversity of opinion, then, appears to be essential, and an element required for our advancement in our onward career. The greater danger appears to be in the other direction, when a whole nation are agreed, and establish as a law of beauty a conventional, ideal form, and by force compel Nature into a shape which is as abhorrent to herself as it is prejudicial to form and even life itself. Throughout the so-called Celestial Empire of China, containing nearly one-fifth of the population of the entire globe, you would scarcely find a man who does not fall into ecstacies at the sight of a broken and distorted foot, which he styles "a golden lily." And how few men in England, or perhaps in Europe, will you meet who will not rhapsodise at the sight of what is called a taper waist! The production of one of these miscalled fatal beauties is at the cost of a yearly sacrifice of a hundred thousand lives to the empire of China, and who shall say how many fall victims in the endeavour to attain the other? Equally erroneous, though fortunately not so dangerous, are often individual opinions on form and beauty, and not only in the higher walks of painting and sculpture, but in music and literature in their higher branches, you will find some who are incapable of perceiving their merit, or of being influenced by their power. This proceeds principally from ignorance of the laws by which excellence is governed. Positive defects have charms for the uninitiated. There are few savage nations (as well as those that boast of their civilisation) that are not impressed with the idea that mutilations or distortions of the human figure add greatly to its charms. I have known some men affirm that that defect (if I may so venture to designate it)—a slight obliquity of vision—is a great improvement to the natural graces of the female face; yet I doubt if they would see it in that light if perpetrated on canvas by the painter's art. There are some who object to the Grecian-sculptured type of face, and declare that they see no beauty in that severe, intelligent, and noble outline; yet I scarcely think they would like to see or approve the *retroussé* style of nose upon the face of a Venus or a Jupiter executed in marble. To some those combinations of heaven-born sounds in which the greatest composers have immortalised their noble thoughts in music, and produced them in the highest forms of their art—the symphony and oratorio—are as an unknown tongue: they understand it not. This proceeds partly from want of education. All men use their eyes and ears; few men educate them. But these instances of unappreciation, let us hope, are rare; and I think we may congratulate ourselves on the unmistakable advance of our intellectual progress. Thirty years ago an oratorio in its entirety would not have been listened to, and the symphonies of Beethoven were pronounced almost by all as impossible to be understood; and I can well remember when that master-work of Weber, "Der Freischutz," first made its appearance it was stigmatised by the press and the public generally as a farrago of nonsense. Yet, *now* the performance of these works would crowd our vast halls almost nightly. But still, the greatest works of the greatest of masters, Beethoven, remain yet to be fully comprehended; these are his posthumous quartettes and his great Mass in D. Even the inspirations of our great poet, dramatist, and philosopher, Shakespeare, were not so popular in his own days as the works of his contemporary, and were but little appreciated down to the time of Charles II., and even later, as we gather from the amusing diary left to us by Pepys, a man of refinement and talent, considering the age in which he lived. He tells us that he shared the general opinion held in those days upon the dramatic works of Shakespeare, and that he much preferred the productions of his own time to those of the great bard. I believe he allowed there was some trifling merit in a play called "Hamlet." Yet, at the present day, what writer can command the homage that is universally conceded to the genius of our immortal poet? Our great painter Reynolds himself acknowledged with the candour of true genius that he failed to perceive the merits of those great works, the cartoons of Raphael! The first sight of them was to him productive of disappointment, and it was only after repeated visits that he became conscious of their stupendous grandeur—in other words, only after he had raised his mind by study to the fitting level to receive the truth. For want of this study you will find that individuals holding adverse opinions will very naturally think that they have quite as much truth on their side, or at all events that there is as much weight (I will not say in their arguments, but) in their dislike of a certain style of form as any one can possess who holds a contrary opinion. But this is the mistake. They forget, or do not know, that the laws of form are governed by as fixed rules as those of light, of colour, or of sound, and are identical with, and as unalterable as, the law that formed and brought into existence the very world on which we live. That the Greeks were conversant with these laws I know not, but I am inclined to think they were ignorant of the principle, as they probably were of anatomy "by dissection"—strange to say, one of the secrets of their excellence and truthfulness in art; but from their naturally refined and exquisite taste, joined to a wonderful sensibility of eye, they arrived at the most just conclusions of unerring laws. It is well known that in their practice of the principles of their architecture, the swelling and diminution of their stately columns, the curve of their volutes, the outline of their capitals, were formed by and decided on by the judgment of the eye alone, contrary to the practice of the Romans, who carried out all these details by strict geometrical rule. A curious and interesting instance of this susceptibility of eye in the Greek artist was shown in the construction of the Temple of Minerva at Athens. It is a simple law in the science of perspective that any long and straight line above or below the level of the eye of the spectator appears to curve, and to the eye really does take that figure, though almost imperceptibly, in order to meet the horizon at the proper point. The well-practised and keen-sighted architect, though he knew not the cause, detected the effect upon the long line of steps that formed the base of his mighty structure, and he absolutely curved his straight lines into the convex form in order that they should appear straight to the eye of the spectator, and, by so doing, give an additional appearance of strength and stability to the noble temple. This wonderful people of antiquity had an intuitive knowledge of many things, and carried to perfection art in many of its branches. But there was one important help to painting they failed to discover—that was, the deceptive-giving though truthful science of perspective. Had that architect who so cunningly counteracted the true perspective of his lines only investigated the cause of the appearance to him of an objectionable curve the theory would no doubt have been discovered and the Greek painter would most probably have rivalled in his productions his giant brother in art, the Greek sculptor. Still, the failure of the discovery is not so much to be regretted, as doubtless, from the perishable nature of the materials employed in the painter's art, together with the fearful destruction, gloom, and desolating wars that the world was destined to pass through in order to purify and advance the civilisation of mankind, few of his works would have survived to give that benefit to pictorial art that we have derived from the more lasting remains of the great works of the Grecian sculptors. Painting, then, it would seem, as well as its sister art, music, has been left to the master-minds of our modern era to carry to perfection. Let us hope that it is a sign and a guarantee, joined to the wonderful discoveries of our own days, that the world is not destined to be disturbed by similar violent convulsions to those she has already passed through, but that the civilisation of mankind will continue to advance without serious interruption unto the end of its allotted time. It is not my intention in this paper to enter more fully into the principles of form, or the laws that govern them. It is sufficient for my purpose to mention that such laws exist. Setting aside, then, the question of the truth or error of opinion as regards true perfection of form, still, I think there are few persons whose thoughts have been turned in that direction, and who possess some knowledge of the subject, but will agree with me that the genius of the Greek artists has left us matchless specimens of their power in the wondrous examples of their imitations of the human figure, and that even now, after a period of more than two thousand years, the mutilated sculptured forms repose upon their pedestals with a proud majesty that must rivet the attention of the most careless observer. So grand are they in design, so truthful to nature, and so wonderful in their finish, that we can scarcely forbear from feeling that the hands that formed them must have been inspired ones. I by no means wish to depreciate the efforts of modern art, or to deny that there have been and now are many truly beautiful and graceful works produced in what we may consider our own days, and of some of which the sculptor and the nation may justly be proud. But without their noble mother, Greek art, without her fostering care and patient teaching by the examples she has left us, we should probably have been floundering about to this hour in as wretched and debased a state as regards sculpture and art generally as the Chinese or New Zealanders of the present day. My purpose, then, is to endeavour to show, as far as my limited time will allow, the probable causes why Greek art towered above all other nations before or since. Many greater powers have existed, and have been permitted to remain on earth for good or for evil over a space of years unnumbered. Copious

* Read before the Society for the Encouragement of the Fine Arts, on Thursday, May 5.

specimens of their progress in art have also been handed down to us, and we can judge of their degree of merit with accuracy, as they are generally in a high state of preservation.

(To be continued.)

ARCHITECTS AND THEIR PLANS.

[We reproduce the following article from the *Times*, as a fair specimen of what people generally think of the merits of the question in dispute between Mr. E. M. Barry and the Government, in contradistinction to the professional view] :—

"A very genteel trade union has just stepped forward to prove that we have not heard the last of the pretensions of the building trades. From the Manchester Brickmakers to the "Royal Institute of British Architects" is a long step, no doubt; but really, in appreciation of self-interest and capacity for self-assertion, we do not see that one society has much to learn from the other. The United Brickmakers demand that brickmaking shall never be made any cheaper; the Associated Architects maintain that an architect always had, and always ought to have, the privilege of getting paid for goods without delivering them. The unanimous resolutions of the profession to that effect may be read in another column, but a word or two may be necessary to render them intelligible.

"The Houses of Parliament, whether from fault of construction or the eternal nature of such things, have been perpetually in want of repairs or improvements, especially in regard to ventilation and warming. It was found no easy matter, as will be readily imagined, to trace all the flues and chimneys of so enormous a building, and so application was made to Mr. E. M. Barry for the plans on which the Palace had been constructed. These drawings would show the courses and connections of the numerous flues, and enable the persons in charge of the work to form a correct opinion of the alterations and proceedings required; whereas, without such information, an infinite amount of labour might be lost and even risk incurred. When, however, Mr. Ayrton, on behalf of the public, preferred this request, he was met by the assertion that such plans were the private property of the architect or his representatives, and did not in any way belong to those who had paid for them. A correspondence between Mr. Barry and Mr. Ayrton ensued, in which the question was discussed, and it was afterwards referred to the Council of the Institute and the various provincial Unions of the profession. The Amalgamated Architects have felt no hesitation in pronouncing their "most decided opinion" that, according to the rule and custom of the trade, "all the drawings and papers prepared for the purpose of erecting a building are and remain the sole property of the architect;" and they encourage Mr. Barry in his resistance to to the First Commissioner's "unprecedented demand." In case of expenses incurred the Union will raise a guarantee fund for the defence of its trade privileges.

"It is not everybody who has had the courage to build a house, but most readers will discern, we imagine, what these pretensions amount to. They amount to a comfortable little mortgage secured upon every house for the everlasting benefit of the architect and his family. You may fancy, after building a house with your own money, and paying pretty handsomely not only for every brick and board in the fabric, but every stroke of pen or pencil made by the designer in framing his plan, that you have a pretty good right to the plans as well as to their product, and that nobody after the bargain is completed has any concern with your house but yourself. Nothing of the kind. You are not to be let off so easily. The clue to the labyrinth of your flues and drains is retained in the architect's hands, so that he, and he only, when anything goes wrong, must be called in to set it right again. An Englishman's house is his castle, but the mysteries of his castle are in the keeping of another. He pays for its "plans" at such a rate that the least he could expect is to have them delivered to him, but that is against "the rule and custom of the profession." These documents belong to the designer, not to the proprietor by whom the designer was employed. It appears to us that if a physician after writing a prescription were to pocket it along with his fee when the medicine had once been made up, the proceeding would be about as reasonable.

"The public, however, may amuse itself with the arguments set forth by this highly respectable Union, in defence of its bye laws. The Amalgamated Architects are discreet enough to keep themselves out of view. They profess to be solicitous for the public alone, though they could not think of giving the public what it has already paid for. They resolve "that it is fitting, and, indeed, necessary for the worthy maintenance of national monuments and buildings, that they should be always under the superintendence of professional men of independent position and high standing, who have been specially educated as architects." This is exactly the language in which Unionists speak of non-Unionists through all the trades in the kingdom; but as the Architects' Institute is good enough to concern itself about our "national monuments" we suggest that they may very safely leave these monuments, such as they are, to their sole proprietor—the nation itself. It is for the nation, and not for any trade union or professional Council, to decide what is "fitting" or what is "necessary" for their "worthy maintenance." The duties of architects are at an end when they have been paid for their works and plans, and have delivered them to their paymasters. If those whom the nation afterwards chooses to employ in repairs or improvements make any mistake, the nation must suffer for it, but we are entitled, at any rate, to all the information which belongs to the bargain. When the architects have given us this, they may relieve themselves from the obligation of perpetual vigilance which they are so anxious to assume. We can decide for ourselves what kind of "position," "standing," or "education" is desirable in the persons we employ.

"As the parties to this trade dispute are very respectable, we hope there will be no "rattening" in Whitehall; but as legal proceedings are threatened, and as the Union has delivered its mind on the question very distinctly, intending house-builders ought to look to their own interests in time. An English House Bill would be a pretty supplement to an Irish Land Bill, but it is hardly necessary. In this island, at any rate, we have not quite outlived freedom of contract, and now that the eyes of the public have been opened, any employer of an architect's services can make the requisite stipulation for himself. What form this stipulation should in future take need hardly be added. When you have built a house the key to its flues and its sewers is just as indispensable as the key to its front door. This clue to the complications of construction should go with the structure itself, and the "drawings and papers" on which the Architects' Union claim a perpetual lien should be deposited with the proprietor of the building, to whom alone they belong, and to whom alone they can be of use. The house is his with all that appertains to it, nor can any other person honestly pretend to any interest in the fabric. Of what advantage can the "drawings" of a building be to the draughtsman, except on the presumption that he has a preferential claim to be consulted on all future occasions. To the proprietor they are of obvious utility, as is seen in the necessities of the public at this moment, and it is to the proprietor, who has bought and paid for them, that they ought to belong. For want of these accessories we are now in difficulty, but we hope that Mr. Ayrton will see us righted, and get one "national monument," at any rate, clear of encumbrances into the hands of the nation itself."

THE MANCHESTER BRICKMAKERS' UNION.

If the statements which appeared in a letter to the *Times* a day or two back are correct, the Manchester operative brickmakers would appear to be doing their best to drag Trade Unionism into the dirt. For twelve months, Mr. Johnson, a master builder, of Manchester, has been dogged and watched and "warned." His premises have been set on fire and an attempt made to blow up his house. The family living next door to him have been advised not to sleep at home, and the Midland Railway Company, for which Mr. Johnson had just completed a building, received information that the brickmakers intended to blow it up.

Mr. Johnson's sole crime is that he has manufactured bricks by machinery, thus defying the Union rules, which forbid the use of any but hand-made bricks. The short-sighted culpabl folly of the trades unionists in this instance fairly lays them open to the charge advanced by the *Times* that they, working men, are conspiring together to prevent the cheapening of house rent even at the cost of atrocious crime. Unfortunately, the past history of this country has not inspired working men with any very deep feelings of trust or confidence in those acts of their employers of which they are unable to foresee more than the immediate consequences. Other trades have adopted the wicked course of action maintained by the Manchester brickmakers, and other trades will, we fear, follow their example before confidence and good feeling shall have been established as the result of the alterations gradually but surely taking place in the laws of labour and capital. Until that time, however, we are bound to demand that the law shall sternly interpose between those who would tyrannically impose on the general community laws tending but temporarily to their own benefit, and permanently to the disadvantage of all.

ARCHITECTURAL SOCIETIES.

Liverpool.—The 22nd annual meeting of the Architectural and Archæological Society was held on the 5th inst., Mr. F. Horner, president, in the chair. A letter was read from Mr. E. M. Barry, in which he thanked the society for its resolution approving of the course taken by him in resisting the demand made upon him by the First Commissioners of Works for the drawings prepared by him for the works in the Palace of Westminster, and expressed the hope that he would persist in his resistance. The Secretary said he had received from the Royal Institute a circular on the same subject, and the council had forwarded to the professional members the pith of the circular, requesting replies. A number of replies had been received, and the consideration of the question was reserved for a meeting of professional members. From the report and financial statement, which was read by Mr. John P. Bradley, the treasurer, it appeared that there had been no falling off in the numerical strength of the society, although the accession of members during last session has not been in so great a ratio as during the two or three preceding years. The subscriptions received during the year amounted to £86 2s., and there is a balance of £2 17s. 5d. in hand. The report having been unanimously adopted, the election of the committee and officers for the ensuing session was proceeded with. Mr. H. H. Vale was elected president, Mr. G. A. Audsley and Mr. John P. Bradley vice-presidents, Mr. Parslow librarian, Mr. G. F. Deacon treasurer, and Mr. H. H. Statham, jun., secretary.—On the motion of Mr. S. Huggins, seconded by Mr. Bradley, a special vote of thanks was awarded to Mr. Statham for his valuable and indispensable services as honorary secretary during the past and preceding years; and on the motion of Mr. Boult, seconded by Mr. Vale, a similar compliment was paid to Mr. Bradley, the retiring treasurer. The president then read his closing address, in the course of which he said—The principal subject of a professional character which has occupied our attention during the last session is that of the proposed new Building Act. There is, I think, no cause for regret that this Bill, in the form in which it was first submitted, has been abandoned for the present at least, and it is to be hoped that its postponement may afford the opportunity for mature consideration on the part of the corporate officers who have charge of it, both as to its general principles and details, and enable them on some future occasion to produce a very different measure from the ill-digested and evidently hastily-framed draft which it was proposed to pass into law. During the past session, I am happy to think there has been no abatement of that unanimity of feeling and good fellowship which have ever existed among the members of this society, and characterises the proceedings of its meetings, and which are so essential to the prosperity of all such associations. By "unanimity" I do not mean a universal agreement of opinion on all points, for this is not only impossible, but, even if possible, would, I fear, render our intercourse "mighty flat." Do not many of us, on the contrary, well remember the time when a sort of internecine war raged among our ranks in the part taken in this room in fighting the "battle of the styles?" Yet in the midst of this warfare Goth and Greek alike seemed on the whole admirably to preserve their tempers in their

intellectual sparring; and though they may occasionally have exchanged some good hard knocks, it was seldom that an unfair blow was dealt, or a word spoken in real anger. Seriously, however, are not the fruits of this very warm controversy of Gothic *versus* Classic Art—which in its day assumed a national character, and occupied the attention of the architectural world, if not to the exclusion of, certainly in precedence of, almost every other artistic question—to be seen in the practice of the present time, in the general attempt to combine and harmonise the best features of each? A vote of thanks to the president for his address, and for the manner in which he had discharged the duties of his office, closed the session.

London Architectural Association.—At the usual fortnightly meeting on Friday evening last, the President, Mr. Lacy W. Ridge, in the chair, a proposal made by Mr. Sharpe (author of "Sharpe's Parallels") that some or all of the members of the Association should join in an excursion for a week to places of architectural interest (such as Lincoln and neighbourhood) was discussed, but no decision arrived at. The report of the delegates of the Association to last year's meeting of the Architectural Alliance (Messrs. T. Roger Smith, T. M. Rickman, R. Phené Spiers, and J. Douglass Mathews) was read, and the same delegates re-elected for the present year. The main incidents in the report were given in The Building News shortly after the meeting of the Alliance last year. A discussion then took place on the question "Was the Renaissance style productive of any real benefit to architecture?" Mr. Aldridge opened in the affirmative, and amongst the speakers were Messrs. R. P. Spiers, Scargill, Mathews, C. H. F. Lewes, Birch, and the Chairman. The following amendment, proposed by Mr. H. W. Lonsdale, was carried by 24 to 21:—"That the spirit of dependence on pedantic precedent introduced at the time of the Renaissance was prejudicial to the true interests of architecture."

Building Intelligence.

CHURCHES AND CHAPELS.

Bath.—A new Baptist chapel at Hay Hill, Bath, which has been erected from the designs of Messrs. Wilson and Willcox, was opened on Thursday week. The chapel, which will accommodate about 650 persons, has galleries on three sides of the building, and the main front is divided into three compartments by two counterfoils terminating in pinnacles. The style is Gothic of the 13th century. In the basement provision is made for holding a Sunday-school. The building has cost, including the site, £2500.

Cardiff.—The foundation stone of another Wesleyan chapel was laid on the 4th inst. The design is Gothic, and the building is to be of Newbridge stone, dressed with Bath stone. At the south-east end will be a fine Gothic tower of great height, and surmounted by six pinnacles. The contract is taken for £4500 by Messrs. Haveson and Pike, of London, Newport, and Cardiff.

Cenarth.—A new church is now in course of erection at Cenarth, from designs by Mr. Middleton, architect, of Westholme, Cheltenham.

Goudhurst.—On Wednesday, April 20th, the Bishop-Suffragan of Dover celebrated the reopening of the chancel and north aisle of S. Mary's, Gouldhurst, Kent. This church is of noble proportions, and of all dates from Early English to late Perpendicular; the tower was rebuilt in 1638, with an unsightly western door and window. It was filled with the highest of pews, and had the usual western gallery with small organ. All these have been removed, save a few specimens in the south aisle. The restoration of the nave and north aisle has cost about £1000. The chancel has been restored by the Ecclesiastical Commissioners. A tile reredos is also promised by the parishioners. The south chantry is now being restored by the proprietors of Bedgbury and Combwell, A. J. B. Beresford-Hope and H. J, Campion, at an expense of some £400; and there yet remains the south aisle, as wide as the nave, and the north chapel, to complete the internal restoration of this large church. Messrs. Slater and Carpenter are the architects of the restoration.

Llangunllo.—The old dilapidated church of Llangunllo has just been replaced by a new one from designs furnished by Mr. Middleton, of Westholme, Cheltenham. The style is described as Geometrical Middle Pointed. Red brick and Bathstone are the principal materials employed externally and internally, the window shafts being of Californian marble. The roof is open-timbered, and the benches are open and of pitch pine, with white deal panels. The floor of the chancel is laid in encaustic tiles by Messrs. Minton, and the tiles in the nave are by Messrs. Godwin, of Lugwardine. The carpenters and joiners' work was executed by Mr. D. Davies, and Mr. D. Thomas was the contractor for the masonry. The total cost is about £1800.

White Colne.—The ancient church of S. Andrew's, White Colne, was re-opened on Tuesday week, after a complete restoration. For many years past the church has been in a very dilapidated condition, so much so indeed that it was uncomfortable, if not dangerous, to use it for divine worship. Last year plans were obtained from Mr. C. L. Moxon, architect, of London, and estimates from Mr. Rogers, builder, of Earls Colne, who has executed the work. About £700 have been expended in the work, but this sum was inadequate to carrying out the restoration of the chancel, which will require at least £200 more. In the interior all the old plastering has been removed, both in the nave and chancel, the false plaster roofs have been removed, the old roof has been carefully restored, the walls of the church replastered, The old stone work of the windows, which was much decayed, has been replaced by new, and the windows of the nave and chancel have been filled in with cathedral glass, having a coloured border. A stained glass window, the subject being "Christ blessing little children," has been placed on the west side of the church. All the old high-backed pews have been removed, and open seats substituted for them. A shingle spire about 30ft. high has also been added. A new porch has also taken the place of the old one, and is composed of stone and flint.

BUILDINGS.

Birmingham.—On Monday last the business of the National Provincial Bank was transferred from the temporary offices in Union-street to the building just erected at the corner of Bennett's-hill and Waterloo-street at a cost of £15,000. Externally the building is of Wrexham stone. The bank is entered by an open vestibule at the corner of Bennett's-hill, the roof of which is elaborately carved and enriched with four sculptured groups, representing the principal industries of the town, viz., the small-arms trade, iron and glass working, and iron moulding. The banking room is 70ft. by 32ft., and the floor, together with the lobby, is paved with Minton's encaustic designs. Pilasters of Devonshire marble, with decorative capitals, separate the windows; and from the ceiling, which is divided into ornamental panels, hang three gas pendants. The bank was designed by Mr. J. Gibson, of London, and was built by Messrs. W. and J. Webb, of Birmingham. Bank extension just now seems to be the rage in Birmingham. The National Provincial makes the third new bank opened in the town within a year; and another—Lloyd's—is in course of erection in Ann-street.

Morley.—The foundation stone of the Odd-Fellows' Hall at Morley, Yorks., was laid on Saturday last. The building is to be erected from designs by Mr. J. Sykes, of West Ardsley and Batley, and will be in the plain Italian style. The contractors are Messrs. Preston and Webster, of Batley; and Mr. Jowett, of Morley.

Stalybridge.—The new public baths recently presented to the town of Stalybridge have been opened. The baths have been erected by Mr. W. Storrs, of Stalybridge, from designs prepared by Messrs. Paull and Robinson, architects, Manchester. They consist of swimming baths, private baths, Turkish baths, with dressing-rooms, and the building also includes a residence for the bath superintendent. There are two swimming baths, one of which is not yet roofed. The covered swimming bath has a water area of 60ft. by 25ft. and the building itself is 70ft. by 40ft. inside measurement. The open bath has a water area of 82ft. by 28ft. Four semi-circular trusses on ribbed principals support the roofs. The dressing-rooms, which are arranged along the sides of the baths, have been admirably fitted up and furnished. Galleries are erected over the dressing-rooms for the use of spectators during swimming matches.

The London University.—The new building of the London University, in Burlington-gardens, was opened by the Queen on Wednesday. We fully described the building in our number of March 5th, 1869, and have on other occasions noticed its progress towards completion.

Wigmore.—The foundation stone of the new West Bromwich and Walsall Industrial Schools was laid at Wigmore on Tuesday. In the competition of architects Mr. E. S. Bindley was successful, and received a premium of £50. The building, now in a forward state of progress, is to be of plain Elizabethan design, and of substantial dimensions. It will be divided into three departments—one for boys, a second for girls, and a third for infants of either sex. Mr. J. Garlick, Villa-street, Hockley, Birmingham, has the contract for the work, which is to cost £11,628.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

Received. J. H. L.—G. D.—N. V.—P. and Son—W. T. G.—W. S.—P. F. N.—B. S.—J. P. S.—J. W. T. and Co.—F. G.—W. K.—Messrs. S. W. and S.—A. P.—R. D. and Co. J. H.—W. R. D.—Rev. J.B.—G. R. R.

G. H. Q.—A minster is a church to which some ecclesiastical fraternity is or has been attached. A cathedral is the principal church of a province or diocese, and was so called from the "Kathedra," or throne of the archbishop or bishop being placed therein.

J. W.—With sketch of Church of S. Paul Villers.

F. G.—With sketch of Melling Abbey returned.

Practical.—Another reply inserted.

F. C. D.—The address and card were mislaid.

Correspondence.

"DR. ZERFFI'S NEW STYLE."

(To the Editor of The Building News.)

Sir,—Though Dr. Zerffi may read the authors he names, he certainly fails to apprehend their meaning. Of the works of Krell and Lübke, they not being known in England, I cannot speak from personal knowledge; but it seems certain that Dr. Zerffi does not understand, or at least correctly quote them; for whilst, according to the one, the Doctor's mythical style is a version of the Doric order, the description of the other, as quoted, makes it a sort of Ionic. If either could be right they cannot both be. As regards Vitruvius, nothing can be further from the truth than that he describes any such style. He simply explains the three well-known Greek orders—Doric, Ionic, and Corinthian—and under which heads is comprised all that exists of Greek architecture. Inasmuch, however, as these styles are Greek, they may all be styled Attic; but an "Attic style," distinct from these, whether resembling Doric or Ionic, exists only in the fertile imagination of the audacious Doctor.

The description of his Attic style was not, as Dr. Zerffi now says, a "general" one, as he attempted to be technical and to describe in detail, displaying his lack of knowledge by speaking of "the dentated ornament" of the corona, the "projecting plinth" of the cornice, and the "crowning member of the frieze"! If Dr. Z. read aright Vitruvius, or any other classical writer of authority, he would not make the mistake of supposing Roman houses to have been "about six stories in height" (Building News, p. 326). The characteristic of the Roman house was its being on the ground-floor only, as minutely described by Vitruvius; and according to the Doctor's own dictum, "the study of one Roman house makes us acquainted with all of them." In exceptional cases there appears to have been an upper story, but used only for inferior purposes. The house proper was on the ground floor.

Dr. Zerffi may try to deceive himself and readers by attributing my necessary opposition to ignorance. It is not a tenable refuge for him. From professional requirements, I have been theoretically and practically familiar with Classical architecture for more than a quarter of a century, and know the buildings of Attica as I know my own fingers.

When convicted of error, the Doctor, with a vast amount of verbiage, generally endeavours to fortify his position by giving a long list of distin-

guished writers who he wishes it to be supposed hold his opinions. This, no doubt, will deceive numbers, but I can safely assert that as regards many of the authors so named they give no warranty for his fantastic views, and his blunders are exclusively his own.—I am, &c., P. E. M.

ABUSES AT THE BOARD OF WORKS.

SIR,—I have no doubt you will be sorry to learn that Mr. Ayrton, First Commissioner of the Board of Works, is again about to commit one of those egregious mistakes which have made his name so notorious of late. This man (I would have written gentleman, but as such a designation implies a refined mind, it would be a misnomer to apply it to one who rejoices in his ignorance of the fine arts) is about to appoint a clerk of works as architect and surveyor for the county courts, at a salary of from £500 to £700 per annum. Ye gods and little fishes, what are the magnates of the profession thinking of that they do not get their clients in Parliament to institute an inquiry into the abuses at the Board of Works? Surely architects, if none others, are concerned in desiring that our public buildings should be entrusted to competent persons who possess more than a smattering of architecture, so that we may no longer be a "byeword among nations." Is there no one amongst the many professional assistants in the Board of Works better qualified than a clerk of works to design architectural works?—or is promotion not extended to architectural assistants in the Board of Works?

Our gentle art seems to stink in the nostrils of the officials presiding over the Board of Works, as nothing but injustice has been meted out to her lovers of late. Mr. Layard, of Ninevite fame, and his valuable assistant, Mr. Fergusson, of world-wide celebrity, have been removed to make way for Mr. Ayrton, of "mind and morality" fame, and his Director of Works, Captain Galton, of the Royal Engineers. Mr. Pennethorne, a veteran in the profession, and Mr. Edward Barry, the eminent Royal Academician architect, have been superseded by Mr. Taylor, whose claim to rank as an architect is on a par with that of an efficient clerk of works. With such talent we may now expect to realise the dream of many a tyro—a new style of architecture.—I am, Sir, &c.,

A LOVER OF ARCHITECTURE.

P.S.—I have just ascertained that the clerks of works belonging to the Board of Works were examined on the 3rd and 4th inst. by the Civil Service Commissioners, on their knowledge of building materials, construction, and taking out quantities, their knowledge of design or architecture being considered by Mr. Ayrton to be of no consequence, or taken for granted.

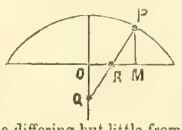
Intercommunication.

QUESTIONS.

[1846.]—CONCRETE WALLS.—Will any of the readers of THE BUILDING NEWS be good enough to inform me, through the medium of your journal, what reliance is to be placed on the statement that concrete walls in which shingle from the sea beach is used are always damp?—G. S. A.

[1847.]—MEASURING GROINED ARCHES. — Some time since I asked through your intercommunication column, if any of your readers could oblige me with a simple rule for measuring groined arches. Would you kindly repeat the question, no answer having appeared to the first. I should also feel obliged for an explanation of the term "Feet run of stop to sunk or moulded work" in masonry.—R. WILLIAMS.

[1848.]—THE TRAMMEL.—A very common mistake with regard to the trammel is often made by some of those who are by no means ignorant of conics. They jump to the conclusion that its movable part is a normal to the curve which it describes, and they are thus induced to think that the curve is not really an ellipse, but a figure differing but little from it. A simple investigation will show that the locus of P (see the figure) is an ellipse.



Q P = a, the semi-axis major,

P R = b, the semi-axis minor,

Q R = $a - b$.

Let O M = x, P M = y, and O R = x'.

Then from similar triangles R P M, R Q O,

P R : R M :: Q R : R O

Or

$$b : x - x' :: a - b : x',$$

Whence

$$x' = \left(1 - \frac{b}{a}\right) x, \quad \therefore \text{ R M, or } x - x' = \frac{b}{a} x$$

And

$$y^2 + \frac{b^2}{a^2} x^2 = b^2,$$

$$\therefore \frac{x^2}{a^2} + \frac{y^2}{b^2} = 1, \text{ the equation to the ellipse.}$$

What is the best instrument in use for describing small ellipses neatly and accurately on paper?—A. J. T.

[1849.]—REPOINTING WALLING.—If, consequent upon frost, or any other cause, pointing falls out previous to the job being delivered up by the contractor, is he not bound to restore the same, in compliance with the terms of his contract, before he is legally entitled to payment therefor.—F.

REPLIES.

[1827.]—LOCKING DRAWERS.—I have seen several methods of locking a number of drawers at one operation. The simplest way is to place a vertical slip of wood on hinges at one side of the chest, and allowed to overlap the ends of the drawers from ¼ to ¾in. The lock is placed in the middle of the slip, and of course, when locked, catches all the ends of the drawers. The specimen I have seen on this principle is a very elegant polished mahogany one, there are two tiers of drawers and the two slips (one of course for each tier) form part of the upright ornamental framing. I could explain another method to "Ignoramus," but fancy this one will answer his purpose; if not, I shall be happy to write again. —ROBERT.

[1837.]—HALIFAX PERMANENT BENEFIT BUILDING SOCIETY'S COMPETITION.—I hope you will allow me, as secretary for the above society, to reply in your paper to the inquiry made by "A Competitor." The Directors of the Society have not been idle since the drawings were sent in on the 8th of February. On the 5th of March they selected the first design, and in accordance with the "Instructions to Architects," called upon the author to satisfy them that it could be carried out for the stipulated sum, £5000. On the 26th ult., at an interview with him, he was informed that he had failed to establish his statements; he expressed himself satisfied with the conducting of the competition, and withdrew from it. On the 4th inst. another design was selected, and the directors are now calling upon the author of this design to comply with the same test. I hope this short explanation will be satisfactory to your correspondent "A Competitor" and the rest of his similarly situated friends.—J. TAYLOR, Secretary.

[1838.]—FALLING OUT OF STOPPING.—Frames should be bedded and pointed in mastic cement in preference to hair mortar.—F.

[1843.]—LAND MEASURING.—The work which I think would best meet the requirements of "A Constant Reader" is Baker's "Land and Engineering Surveying," in Weale's Series, price 2s. Mr. Baker, C.E., combines, with a sound practical acquaintance with surveying, a knowledge of the higher branches of mathematics, and on this account his work is well suited to the modern surveyor. He was one of the earliest to propound the means of laying out railway curves, and has extended the usefulness of Nesbit's work by the addition of two or three chapters on "Railway Surveying." Should "A Constant Reader" desire but an elementary acquaintance with the subject, Baker's work would be as well suited to his purpose as any. Quested's work, principally designed for school use, and the "Country Surveyor" would be found serviceable; there are several to be obtained of a similar description at 3s. or 4s.—K. J. BEECHAM.

LEGAL.

BUILDERS' CHARGES.—At the Bow County Court on the 22nd ult., the case of Prosser *v.* Elphicke was heard before Mr. Dasent, the judge, the action having been, by order of the judges of the Superior Courts, sent for hearing in the County Court. Plaintiff is a builder, of Poplar, and the action was brought to recover £26 17s. 11d., being the balance on an original account of £49 13s. 4d., for work done and materials supplied. From the evidence, it appeared that some time since defendant leased certain lands to plaintiff, and advanced him money wherewith to build. Plaintiff commenced building, but before the houses were finished, he became a bankrupt, and defendant, under a forfeiture clause in the agreement, took possession of the houses. In July, after plaintiff's bankruptcy, he entered into an agreement with defendant to finish the houses begun by him. When plaintiff finished his work he called in a surveyor, by whom it was measured, and the bill made out for £49 13s. 4d. He had received from Mr. Elphicke at different times money amounting to £22 16s., and Mr. Elphicke's plea was that this amount settled the claim. The point in the case was whether the last money given to plaintiff by defendant, while the work was in progress, was or was not given in full settlement. The last money which passed between the parties was a £10 note, which defendant alleged he gave to plaintiff upon the understanding that the work would be completed for that. Plaintiff, on the other hand, averred that the £10 was merely on account, and not in settlement. Mr. Jackson, a surveyor, was called, and deposed that the charges made by plaintiff were fair, and Mr. Algar, surveyor, of Stratford, was called, and deposed that the charges were excessive. His Honour said that if the £10 were given in settlement, then Mr. Elphicke ought to have had a written agreement. There was no such agreement, and judgment would be given for plaintiff. Some of the charges, however, appeared to be excessive, and £14 of the claim would be disallowed. Upon the question being raised as to how far this verdict entitled plaintiff to the costs incurred in the Superior Courts, his Honour said he had no power to certify for those costs, if he had he did not think he should award them to plaintiff.

Our Office Table.

THE HARROGATE VICTORIA BATHS ESTATE COMPETITION.—At the meeting of the Harrogate Improvement Commission on Monday week, the chairman expressed surprise that only five architects had competed out of 150 applicants for plans. An intending competitor writes complaining of the short time allowed for preparing the designs. He says, I myself applied for conditions early in March last, but only obtained them on the 19th ultimo, and this did not leave sufficient time to prepare the necessary designs. If this had been the case with other architects, it will account for the smallness of the number of designs received. Under all the circumstances, I think the Commissioners might have found it advantageous to have made another small extension of time.

THE OXYHYDROGEN GAS IN PARIS.—The Oxyhydrogen Gas Company have obtained the right from the city of Paris to lay down twenty miles of gas piping for the purpose of giving the oxyhydrogen light a trial for lighting a portion of the city. The gas will be made at Pantin, outside Paris, and conveyed in tubes placed inside the the drains up to the Passage Jouffroy in the Boulevard Montmartre. This passage, well known to visitors, is *now* lit up with the oxyhydrogen light every evening; but the new mode of lighting will be extended from thence along the remainder of the Boulevard Montmartre, the Boulevard des Italiens and Capucines, as far as the Grand Café. This is the finest part of Paris, and if the experiment succeeds here the future of this mode of lighting is probably secure. Not only is it half the price of the lighting by coal gas, or, if preferred, a double light at the same price, but it does not vitiate the atmosphere in which it burns, and takes no oxygen away from it.

THE INSTITUTION OF CIVIL ENGINEERS.—We are given to understand that the late Mrs. Appold has left to the Institution a legacy of one thousand pounds—£1000—payable at the same time as the legacy for a similar amount from her husband, the late Mr. J. G. Appold, F.R.S., Assoc. Inst. C.E. It is believed that both bequests have been made "for the general use and benefit of the Society," without being fettered with any conditions.

OPENING OF ANOTHER TRAMWAY.—The North Metropolitan Tramway Company afforded to East-end London an opportunity on Monday of judging the efficacy of the project of laying down street tramways. They opened at five o'clock in the morning two miles and a half of tramway—viz., from Whitechapel Church to Bow Bridge, and were before eight o'clock in full operation, to the utter astonishment of the inhabitants of that particular district, and to the admiration of those more acquainted with the difficulties that have been surmounted by Messrs. Fisher and Parrish, the contractors, and Mr. Hopkins, their engineer. The road is formed of an up and down line, which are so constructed as to form the safest possible grooves for the wheels of the car, and at the same time to obviate anything like an impediment to the traffic of an ordinary vehicle.

THE ARTISTS' GENERAL BENEVOLENT INSTITUTION.—On Saturday evening the fifty-fifth annual festival in aid of the funds of the Artists' General Benevolent Institution was held at Willis's Rooms, London, the Duke of Argyll presiding. In giving the toast of the evening, "Prosperity to the Artists' General Benevolent Institution," the chairman made an eloquent appeal on behalf of the organisation, and dwelt upon a variety of details which he considered entitled it in a remarkable degree to the support of all lovers of art. Seventy-nine applicants were relieved during 1869 with the sum of £1255; seventy-three at the quarterly meetings with £1115; and six urgent cases with £140. The Duke thought that these were facts which might well recommend the Institution to the support not only of artists, but of the public generally. His Grace stated that Sir William Tite, to whom application had been made on behalf of the funds of the institution, had sent the munificent sum of £1000. Amongst the other toasts were "The Academy" for which Sir F. Grant responded; and "The Water Colour Societies." Subscriptions, amounting in in all to £1583, the largest ever received at a festival of the institution were announced in the course of the evening.

SOVEREIGN LIFE ASSURANCE COMPANY.—The ordinary general meeting of the proprietors of this company was held on the 4th inst. The Secretary (Mr. Davenport) having read the notice convening the meeting, and the minutes of the last general meeting, proceeded to read the report. The proposals for Life Assurance submitted to the consideration of the directors during the past year amounted to the sum of £410,000. From these 458 policies were issued assuring £311,250, being an increase on the preceding year of £10,420. The average amount of each policy was £680, a sum considerably in advance of former years. The new yearly premium income derived from the above policies was £8843 18s. The usual dividend of 5 per cent. on the paid-up capital and bonus additions is again recommended by the directors.

Chips.

The volume of the Archæological Survey of India, containing the report, with plans and photographs, prepared by Lieut. H. Hardy Cole, R.E., by order of the Indian Government, is now in the binder's hands, and will shortly be published.

Mr. Alexander H. Ritchie, a Scottish sculptor, whose works are well known in Edinburgh, died last week. He was a self-made man.

A Presbyterian Church has been commenced at Carlingford, Co. Louth. The material to be used is dark limestone, with quoins and dressings of Newry granite. Mr. Thomas Browne, of Carlingford, is the contractor.

The Duke of Devonshire has just sent a cheque for £1000 towards the fund for building a tower and spire at S. Saviour's Church, Eastbourne.

A new Presbyterian Church is in course of erection at Stratford.

The proposal for a ship canal from Manchester to Liverpool has been revived.

A new Presbyterian Church is abont to be erected in the Downs-park-road, Hackney, at the corner of Cricketfield-road.

Portman Chapel, Marylebone, is to be enlarged.

A vacancy in the office of surveyor of roads and inspector of trees in Windsor Great-park has been caused by the death of Mr. G. Perkins, who for forty years was a faithful servant of the Crown.

The additions to the Public Hall, Atherton, are in a very forward state, and will shortly be completed.

Timber Trade Review.

SALE by Auction, on Thursday and Friday, the 5th and 6th of May, of the stock of dry planks, &c., the property of the late firm of Messrs. Lambert and Chapman, Pimlico Wharf, near Vauxhall-bridge.

FIRST DAY'S SALE.

	s. d.		s. d.
21ft. 3 × 11, 1st white Petersburg planks per 12ft. lengths	4 1	to	4 3
16ft. do., do.	3 11	„	4 0
15ft. do., do.	3 10	„	4 1
6 to 8ft. 3 × 9, best Soderham yellow deals	2 9		
10ft. do., do.	2 9		
11ft. do., do.	2 10		
12ft. do., do.	3 2		
13ft. do., do.	2 8	„	2 9
14ft. do., do.	2 11	„	3 1
15ft. do., do.	2 11	„	3 0
16ft. do., do.	2 10	„	3 0
17ft. do., do.	2 10		
18ft. do., do.	2 10	„	3 0
19ft. do., do.	2 10		
20ft. do., do.	2 10	„	2 11
21ft. do., do.	2 11		
22ft. do., do.	2 10	„	2 11
23ft. do., do.	2 10	„	3 0
24ft. do., do.	3 0	„	3 1
25 to 27ft. do., do.	3 0		
12ft. 2½ × 6½, 2nd dram yellow battens	1 3	„	1 6
10 and 11ft. do., do.	1 3	„	1 4
13 to 15ft. do., do.	1 3		
16 to 20ft. 3 × 2, 3rd Gothenburg yellow deals	2 6		
21ft. do., do.	2 6		
22ft., do., do.	2 7		
23 and 24ft. do., do.	2 6		
25 to 27ft. do., do.	2 4		
9 to 11ft. do., do.	2 6		
7 to 11ft. 3 × 11, 1st Wyburg yellow planks	3 7		
16 to 19ft. do., do.	3 8		
20ft. do., do.	3 9	„	3 10
21ft. do., do.	4 0		
12 to 16ft. 2½ × 7, do. battens	1 7		
18ft. 3 × 7, do.	2 0		
9 to 11 ft. 4 × 9, Gothenburg yellow deals	3 7		

Prepared flooring boards at per square—viz., per 140ft. run of 9in., 180ft. run of 7in., and 190ft. run of 6½in.

⅞ × 7, 1st white flooring boards ... per sq.	8 0	„	8 3
⅞ × 6½, do.	7 9	„	8 3
1 × 7, do.	8 3	„	8 6
1 × 7, do. (short length)	7 9		
1 × 9, do. flooring boards	10 9		
⅞ × 7, 1st yellow do.	8 6	„	9 6
1 × 7, do.	10 3	„	11 0
1¼ × 7, do. (short lengths)	12 6	„	12 9
1¼ × 7, do. (15 to 21ft.)	14 0	„	14 9
1 × 9, do.	10 6		
1 × 7, do. (Wyburg) do.	11 6	„	11 9
1 × 7, 1st white (Wyburg) do.	9 3	„	9 6

Prepared match boards, tongued, grooved and beaded, at per square.

¾ × 7, 1st yellow flooring boards	12 0	„	12 3
¾ × 6½, do.	11 0	„	11 9
⅞ × 7, do.	9 0	„	9 3

Fir quarters, 5 × 5, 25s. per load of 50 cubic feet.

12ft. 3 × 9 white spruce deals per 12ft. lgth.	2 2	„	2 4
13 and 14 ft. 3 × 8, do.	1 9		

Swedish timber, 46s. per load; Dantzic, 47s.; Memel, 55s. to 57s.

SECOND DAY'S SALE.

12ft. 3 × 11, Quebec 1st pine planks per 12ft. length	6 8	to	7 1
12ft. 3 × 11, do. 2nd do.	4 10	„	5 0
12 to 18ft. 3 × 9, 1st yellow deals	3 9		
12 to 24ft. 3 × 11, Dantzic yellow planks	3 4		
16 to 17ft. 3 × 2, do. deals	3 1		
18 to 20ft. 3 × 9, crown Riga white deals	2 5	to	2 6
18ft. × 9, 3rd Gothenburg yellow deals	2 7		
21ft. do., do.	2 6	„	2 7
22ft. do., do.	2 5	„	2 8
11 to 13ft. 3 × 8, best Gefle yellow deals	2 3		
14 to 19ft. do., do.	2 6		
15 to 18ft. do., do.	2 5		
20ft. do., do.	2 5		
21ft. do., do.	2 4		
22ft. do., do.	2 5		
23ft. do., do.	2 6		
24ft. do., do.	2 10		
17ft. 2½ × 7, best Wyburg yellow battens	1 10		
19 to 22ft. do., do.	1 9		
7 to 9ft. 3 × 9, do. deals	2 4		
10 and 11ft. do., do.	2 4		
16 to 20ft. do., do.	2 8	„	2 10
21ft. do., do.	2 9		
16 to 27ft. 2½ × 6½, 2nd dram yellow battens	1 4		
1½in. pine mouldings per 100ft.	2 2	„	2 6
1¼in. do.	2 0	„	2 1
1⅛in. do.	2 4		
2in. do.	2 10	„	3 0
1in. do.	1 7	„	2 0
2½in. do.	4 2	„	4 6
3in. do.	4 1	„	4 9

Dry Riga wainscot at per superficial foot of 1in. for thicknesses of 1in. and upwards, and at per superficial foot of its thickness if under 1in.

	d.		d.
¼in. dry Riga wainscot per sup. ft. of ¼in.	2¾	to	4
⅜in. do. „ ⅜in.	5¼		
1in. „ 1in.	6½	„	8¼
1¼in. do.	7¼	„	8¼
1½in. do.	7	„	8
2in. do.	7¼	„	8
2½in. do.	7¼	„	8
2¾in. do.	7¾		
3in. do.	7	„	8
4in. do.	7¾		

Honduras Mahogany.

¼in. dry Honduras mahogany per sup. ft. of ¼in.	3¾		
⅜in. do. „ ⅜in.	4¼	„	5
1in. do. „ 1in.	5¾	„	8¼
1¼in. do.	7¼		
1½in. do.	5	„	7
2in. do.	7½		
2¼in. do.	6¼	„	7¼
3in. do.	6¼	„	7¼

Messrs. Churchill and Sims' sale by auction at the Baltic Sale Room yesterday, 11th of May, consisting of 21,000 spruce deals, 11,000 Quebec pine deals, 20,000 Swedish deals and battens, 89,000 Norway deals and battens, 6000 S. Petersburg, Archangel, and Onega deals, 300,000 prepared flooring and match boards, 6800 fresh Norway spars and poles, 100 fathoms lathwood, 500 memel and wainscot logs, 12 loads Swedish beech, 120 loads Quebec walnut, 70 loads Quebec waney board yellow pine, 270 loads Swedish fir, 170 loads Dantzic fir, 16 loads Kawrie pine, &c., &c.

	s. d.		s. d.
Dantzic best middling timber per load	77 6	to	82 6
Swedish timber	43 0	„	50 0
Riga crown English logs per 18 cubic ft.	95 0	„	105 0
Riga Dutch logs	77 6	„	82 6
Memel wainscot logs	42 6		
	£ s.		£ s.
Archangel best yellow per Petg. std.	12 0	„	12 5
Petersburg second white	8		
Wyburg best yellow	9 5		
Norway mixed 1 and 2 white per 120, 12 3 × 9	11 15	„	12 10
„ Third white	7 0		
„ Mixed yellow per Petg. std.	8 0	„	8 10
„ Second yellow	7 10	„	8 10
„ Third yellow	6 15	„	7 10
„ 2½ × 6½ battens per 120, 12 2½ × 6½	5 5	„	6 10
Laurvig mixed 1 and 2 white per 120, 12 3 × 9	12 10		
Gefle mixed 1 and 2 yellow per Petg. std.	11 5		
Gefle third yellow	9 0		
Onega third yellow	8 10	„	8 15
Bjorneborg handsawn yellow	6 15	„	7 0
Gothenburg mixed 1 and 2 yellow	9 10	„	9 15
Do. third do.	7 15	„	9 5
Do. third and fourth white	7 5		
Do. mixed 1 and 2 do.	8 0		
Do. third do.	7 0		
Quebec best floated yellow pine (narrow)	14 0	„	15 15
Do. second do.	11 10	„	12 10
Do. third do.	9 10	„	10 0
Do. third bright do.	9 10		
Do. best floated red pine	12 10		
Do. third do.	7 10		
Do. best white spruce per 120, 12 3 × 9	16 15		
Do. waney board yellow pine (bought in) per load	0 70		
	£ s. d.		£ s.
Riga lathwood per cubic fathm.	4 17 6	„	5 0
Dantzic	4 15 0		
Paskallavik do.	4 7 6		
S. John's white spruce per 120, 12, 3 × 9	12 15 0	„	13 10
Rimouski do.	14 10 0		
Pugwash do.	11 0 0	„	12 0
	s. d.		s. d.
¾ × 7 best yellow flooring boards per sq.	7 0	„	7 3
¾ × 6½ do.	7 0		
⅞ × 6½ do.	8 3	„	8 9
⅞ × 7 do.	8 3		
1 × 6½ do.	10 6	„	1 0
1 × 7 do.	10 6	„	1 6
1¼ × 6½ do.	13 6		
⅞ × 6 second yellow flooring boards			
⅞ × 7 do.	7 3	„	7 6
⅞ × 6½ do.	7 3	„	7 6
⅞ × 7 do.	6 3		
¾ × 6½ do.	6 6		
¾ × 6 do.	6 6		
1 × 6 do.	7 6		
1 × 6½ do.	8 6	„	8 9
1 × 7 do.	8 6	„	8 9
1¼ × 6½ do.	10 6		
1¼ × 7 do.	10 6		
¾ × 7 mixed 1 and 2 do.	6 9		
⅞ × 5 do.	6 6		
⅞ × 5½ do.	6 6		
⅞ × 6 do.	6 0		
1 × 6½ do.	9 0		

	s. d.		s. d.
1 × 7 mixed 1 and 2 yellow flooring boards	9 0		
1¼ × 6½ do.	11 0		
⅞ × 5 best white do.	7 6		
⅞ × 7 do.	8 6		
⅞ × 6½ do.	8 3		
1 × 7 do.	9 6		
¾ × 7 second do.	6 3		
¾ × 5 do.	6 0		
⅞ × 6 do.	6 6	„	7 3
⅞ × 7 do.	7 3		
⅞ × 6½ do.	7 3		
1 × 6 do.	7 0		
1 × 6½ do.	8 0		
1 × 7 do.	8 0		
1 × 5 mixed 1 and 2 do.	5 6		
¾ × 6 do.	5 6		
¾ × 5 do.	6 6		
⅞ × 6½ do.	7 6		
Grooved, tongued, and beaded.			
½ × 6½ best yellow flooring boards	5 0	„	5 9
½ × 6 do.	5 6		
½ × 6½ do.	7 0		
⅝ × 7 do.	6 0	„	6 9
⅝ × 6 do.	8 0	„	8 3
⅝ × 5 do.	7 6		
⅝ × 5½ do.	7 6		
⅝ × 6 second do.	7 0		
⅝ × 6½ do.	4 9		
⅝ × 5 do.	6 6		
⅝ × 5½ do.	6 6		
1 × 6½ do.	8 0		
⅞ × 6½ do.	7 0		
⅞ × 6½ do.	7 0		
⅞ × 6½ best white do.	5 3		
⅞ × 6½ do.	6 6		
⅞ × 6½ do.	8 0		
1¼ × 6½ do.	12 0		
1 × 6½ do.	9 3	„	9 6
¼ × 6½ mixed 1 and 2 do.	5 0		
Quebec walnut timber bought in per cub ft.	3 0		
Christiana spars 4 to 6in. per foot run	0 1⅛		
Swedish laths. per bundle, 36 ft. run	0 6		
Fredrickstadt mouldings per 100ft. run	1 3		
Do. skirtings	2 11		
Do. pantile laths per 144ft. run	0 10	„	0 11
Do. slating laths	0 11		
Kawrie pine timber per cubic ft.	1 8	„	1 9
Warburg beech timber	1 0		

STRING AND CALLIPER MEASURE.—Mr. Edwin Chaloner will sell to-day, May 13, at Liverpool, 857 logs of peak, the calliper measure of which is 31,784 cubic feet. and the string measure 29,342½ cubic feet. This is a material difference in favour of string measure, by which this cargo is to be sold. Calliper measure is the measure on which freight is paid, or, in other words, the space the timber occupies in the ship, and is manifestly a very unjust way of selling.

LATEST PRICES OF MATERIALS USED IN CONSTRUCTION.

TIMBER.

	£ s.	£ s.
Teak load	12 10	13 0
Quebec, red pine	3 15	4 15
„ yellow pine	4 0	5 0
St. John, N.B. yellow	0 0	0 0
Quebec oak	5 15	6 5
„ birch	3 15	5 0
„ elm	4 5	5 5
Dantzic oak	4 5	6 5
„ fir	2 5	4 5
Memel fir	2 5	3 15
Riga	2 15	3 2
Swedish	2 0	2 13
Masts, Quebec, red pine	3 10	5 10
„ yellow pine	3 10	5 10
Lathwood, Dant. fm.	4 0	5 10
„ St P'burg.	5 5	6 5
Deals, pr C., 12ft by 3 by 9 in.		
Quebec, white spruce	12 0	17 0
St. John, white spruce	12 10	15 0
Yellow pine, per reduced C.		
Canada, 1st quality	18 0	19 0
2nd do.	12 0	13 0
Archangel, yellow	11 0	12 0
St. Petersburg, yel.	11 0	12 0

	£ s.	£ s.
Finland	6 10	8 0
Memel	7 0	9 0
Gothenburg, yellow	8 0	9 0
„ white	0 0	0 0
Gefle, yellow	9 0	10 10
Soderham	8 0	9 10
Christiania, per C., 12 ft. by 3 by 9 in yellow	10 0	12 10
Flooring Boards, per sq. of 1in., first yel.	7 6	10 6
First white	7 0	9 6
Second qualities	6 0	7 0
PUMICE STONE per tn	6 0	8 0
OILS, &c.		
Seal, pale per tun	42 10	0 0
Sperm body	91 0	0 0
Cod	41 0	42 0
Whale, Sth Sea, pale	38 0	0 0
Olive, Gallipoli	56 0	0 0
Cocoanut, Cochin, tun	45 0	46 0
Palm, fine	39 10	40 0
Linseed	32 5	0 0
Rapeseed, Eng. pale	45 10	46 0
Cottonseed	31 0	36 0

METALS.

LEAD :—			
Pig, Foreign per ton	18 0 0	18 2 6	
„ English, W.B. do.	19 5 0	19 7 6	
„ Lead Co. do.	18 17 6	19 0 0	
„ Other brands do.	18 5 0	18 12 6	
Sheet Milled do.	19 5 0	19 10 0	
Shot, Patent do.	22 0 0	0 0 0	
Red or minium do.	20 C 0	0 0 0	
Litharge, WB do.	0 0 0	0 0 0	
White dry do.	26 0 0	28 0 0	
„ ground in oil do.	26 0 0	29 0 0	
COPPER :—			
British—cake and ingot per ton	70 10 0	71 0 0	
Best Selected do.	72 0 0	73 0 0	
Sheet do.	75 0 0	76 0 0	
Bottoms do.	78 0 0	78 10 0	
Australian do.	73 0 0	75 0 0	
Spanish Cake cash	0 0 0	0 0 0	
Chili Bars „	66 10 0	67 10 0	
„ refined ingot	71 0 0	74 0 0	
Yel. Metal Sheathing & Rods per lb.	0 0 6½	0 0 6¾	

MEETINGS FOR THE ENSUING WEEK.

TUESDAY.—Institution of Civil Engineers. 1st Discussion upon Mr. Briggs's paper on "Rotary Fans." 2nd Mr. E. A. Cowper, on Recent Improvements in Regenerative Hot Blast Stoves for Blast Furnaces. 8.
„ Royal Institution. On the Principles of Moral and Political Philosophy, by Prof. Blackie. 3.

WEDNESDAY.—Society of Arts. On International Money of Account, independently of International Coinage, by J. A. Franklin, Esq. 8.

THURSDAY.—Society for the Encouragement of the Fine Arts. Third *Conversazione* of the Season, at University College, Gower-street.
„ Royal Institution. Lecture by Prof. Tyndall, LL.D., F.R.S. 3.
„ Society of Antiquaries. 8.30.

FRIDAY.—Royal Institution. 9.
Architectural Association. Paper by Mr. T. H. Watson, V.P., A.R.I.B.A., on Remarks on Monumental Sculpture. 7.30.

SATURDAY.—Royal Institution. On Astronomy, by Prof. R. Grant, LL.D., F.R.S. 3.

Trade News.

TENDERS.

BIRMINGHAM.—For the erection of edge tool works at Aston. Mr. William Hale, Birmingham, Architect. Quantities supplied:—

Wykes	£1120
Moffatt	1078
Webb	1066
Barnsley	1038
Surman	981
Blore	900
Ravenscroft (accepted)	889

BRIGHTON.—For six houses at Brighton. — Crawford, Esq., architect:—

Nightingale	£9150
Sawyer	8555
Baker	8508
Peskett and Taylor	8184
Blackmore	6255

CATERHAM.—For house, stables, &c., at Tupwood, Caterham, for J. T. Redgate, Esq. R. Martin, Esq., architect. Quantities supplied by Mr. F. Sparrow:—

	House.	Greenhouse and Conservatory.	Stables.	Total.
Roberts	3250	379 0	499	4128 0
Blackmore	3248	331 10	527	4106 10
Pollard	3145	243 0	585	3973 0
Turner and Sons	3141	293 0	513	3947 0
Williams and Sons	3178	277 0	487	3942 0
Dove Bros.	2975	325 0	505	3805 0
Hearle	2997	335 0	465	3797 0
Ward	3000	250 0	424	3674 0
Chappell	2888	241 0	451	3580 0
Jarrett	2850	246 0	450	3546 0

CITY OF ROCHESTER.—Mr. Henry Andrews, Surveyor, Rochester:—

Contract No. 1—Landing Place, Strood.

West	£1330
Sollitt (for all four contracts)	1275
Gates	1200
Ball	1040
Clements (accepted)	845

Contract No. 2—Ship Pier.

Pankhurst	£145 0
Currell	131 15
Gates (accepted)	120 0

Contract No. 3.—Barge.

Gates	£87 0
Higham	85 16
Currell	79 10
Gill	75 14
Weedon (accepted)	65 0

Contract No. 4.—Repairs to House, Guildhall Lane.

Hopper	£143 10
Verrall	110 0
Newnham	67 10
Gates (accepted)	63 0

HIGH WYCOMBE.—For the erection of two semi-detached houses, Amersham-hill. Mr. Arthur Vernon, Architect. Quantities supplied:—

Silver & Son	£1825 0 0
Honour	1763 0 0
Looseley	1754 0 0
Woodbridge	1750 0 0
Reavell	1750 0 0
Hamlin	1749 7 4
Wood & Co.	1699 0 0
Ward	1695 0 0
Hunt	1680 0 0
Spicer	1670 0 0
Cooper	1664 5 0
Morrison	1641 6 0
Nightingale	1555 0 0

KENT.—For new public rooms, at Belvedere, Kent. A. R. Pite, Esq., architect:—

Niblett	£2090
Kilby	1929
Peskett and Taylor	1870
Knight	1788
Cowland	1780
Gambell	1775
Blake	1729
Nightingale	1717
Vickery	1675
Soht	1660
Blackmore and Morley	1650
Willis	1630
Carter and Son	1570
Harrison and Edwards	1520
Johns	1397

LONDON.—For vaults and roads at Newgate-market. Horace Jones, Esq., architect:—

Reddin	£2859
Coker	2630
Hart	2500
Crabb	2350
Pearson	2275
Marshall	2250
Kilby	2196
Henshaw	2193
Maxwell	2150
Cockrill	2125
Booth	2120
Newman and Co.	2075
Hill, Keddell, and Waldram	2049
Wicks, Bangs, and Co.	1995
Knight	1990
Mowlem and Co.	1898
Ladd	1887
Bloomfield	1870
Goodair	1853
Wigmore	1738

LONDON.—For alterations and additions to the Phœnix Hotel, Princes-street, Cavendish-square, for Mr. Grey. Mr. A. Wright, architect:—

	Alterations.	New counter.
Watson Bros.	£80 10	126 0
Hyde	271 0	116 0
J. Saunders	223 10	75 0
F. Saunders	197 0	71 0
Poole	176 0	107 0
Smith	198 5 including counter.	

TUNBRIDGE WELLS.—For public rooms, offices, &c., at Tunbridge Wells. Messrs. Wilson and Willcox, Architects. Quantities by Mr. Thos. Ladds:—

Edwards Brothers	£10,762
Harvard Brothers	9,650
Markwick & Thurgood	9,635
Strange & Sons	9,587
Matthews	9,525
Booth	9,371
Wood	9,337
Anscombe	8,990
Blackmore	8,955
Mitchell	8,800
Bayes & Ramage	8,770
Macey	8,769
Adcock & Rees	8,529
Nightingale	8,410
Henshaw	8,377
Tunbridge & Denne	8,338
Higgs	8,234
Willicombe & Oakley	7,897

CONTRACTS OPEN FOR BUILDING ESTIMATES.

HORNCASTLE LOCAL BOARD, May 17.—For paving with Mount Sorrel about 1676 superficial yards of a street, in the town of Horncastle. Richard Clitheroe and Fred. W. Tweed, Clerks to the Board, Horncastle.

NORWICH, May 19.—For the construction of two covered service reservoirs and other works connected therewith at Likenham. John Saltzer, Chairman, Water Works Office, Surrey-street, Norwich.

PETWORTH, May 16.—For the alteration and restoration of the parish church of Cold Waltham, near Petworth. Rev. James M. Sandham, at the Vicarage.

PLYMOUTH, June 10.—For the erection of a guildhall, law courts, and municipal offices. Whiteford, Town Clerk, Town Clerk's Office, Guildhall, Plymouth.

LEEDS, May 30.—For the erection of semi-detached villas at Arthington, near Leeds. William Bakewell, architect, 12, East Parade, Leeds.

STOCKPORT, May 24.—For the design and erection of an iron girder bridge across the River Mersey, within the district of the local Board. Walter Hyde, Clerk to the said Board, Stockport.

RYDE, May 19.—For the supply of about 800 yards of 24-inch cast-iron sewer pipes. W. H. Pullen, Town Clerk. Ryde.

HURSTPIERPOINT SPECIAL DRAINAGE DISTRICT, May 16.—For the construction of upwards of 4200 lineal yards of stoneware pipe sewers, the reconstruction of a bridge over the stream crossing the Cuckfield-road. Samuel White, Hurstpierpoint.

BODICOTE, near Banbury, May 19.—For the erection of a residence. Mr. T. M. Lockwood, architect, 85, Foregate-street, Chester.

SALTBURN-BY-THE-SEA, May 30.—For the erection of the Saltburn Convalescent Home. Mr. J. Oliver, F.R.I.B.A., architect, 66½, Northumberland-street, Newcastle-upon-Tyne.

NEWCASTLE-ON-TYNE, May 25.—For the erection of a Branch Office for the Royal Insurance Company. Mr. Parnell, 21, Collingwood-street, Newcastle.

EPPING SPECIAL DRAINAGE DISTRICT, May 17.—Water Supply.—Contract No. 4.—For the supply and erection of a wrought-iron high service reservoir, with wrought-iron girders, cast-iron connections, &c. Contract No. 5.—For the supply and laying of water mains throughout the district, and supplying and fixing of hydrants, bends, valves, &c. Contract No. 6.—For the construction of sewers, manholes, ventilating shafts, junctions, &c. Mr. Jabez Church, 17B, Great George-street, Westminster, S.W.

WAKEFIELD, May 20.—For the erection of a Wesleyan chapel and Sunday schools at Eastmoor. William Watson, architect, Barstow-square, Wakefield.

HACKNEY DISTRICT, May 26.—For laying down and constructing 1210ft. of 4ft, barrel sewer, 2120ft. of 3ft. 9in. by 2ft. 6in. sewer, 1950ft. of 3ft. 6in. by 2ft. 3in. half-brick sewer, and 880ft. of 15in. pipe sewer, near the River Lea. Richard Fllis, Clerk to the Board, Town Hall, Hackney.

CROYDON LOCAL BOARD OF HEALTH, May 23.—For the construction of a building to be erected over the patent solid sewage extractors, at the sewage filters, Brimstone Barn, Croydon. R. J. Cheesewright, Clerk, Town Hall, Croydon.

KINGSTON-ON-THAMES, May 17.—For supply and laying down 1000 square yards of Yorkshire stone flagging. Walter M. Wilkinson, Town Clerk, Kingston-on-Thames.

SALFORD.—EXTENSION OF TIME.—The time for receiving tenders for the sewering, paving, and flagging of streets and passages in the Salford district is extended from the 6th to the 20th instant Geo. Brett, Town Clerk, Town Hall, Salford.

SALFORD, May 20.—For the supply of pitch and creosote oil, for asphalting purposes. Geo. Brett, Town Clerk, Town Hall, Salford.

LONDON, May 24.—For the supply of cast ironwork for a period of three years. Joseph Daw, Principal Clerk, Sewers Offices, Guildhall.

GREAT WESTERN RAILWAY.—NEW STATION BUILDINGS AT BIRMINGHAM, May 25.—For the construction of new booking offices and other buildings at the Snow-hill Station, Birmingham. Frederick G. Saunders, Secretary, Paddington Station.

LEEDS, May 30.—For the erection of semi-detached villas at Arthington, near Leeds. William Bakewell, architect, 12, East Parade, Leeds.

CHELSEA, May 25.—For the erection of dispensary and bakehouse. William Miller, Clerk to the Guardians, Arthur-street, Chelsea, S.W.

BIRKDALE LOCAL GOVERNMENT BOARD, May 28.—For the execution of the following works in connection with the main sewage of their district:—Contract No. 1. For the supplying and laying of about 17,976ft. of earthenware pipe sewers, up to 24in. diameter; for the construction of about 6260ft. of brick sewers, 2ft. by 2ft.; two subsidence tanks, storm overflows, sluices, forming and asphalting of approach road and wharf, &c. Reade and Goodison, civil engineers.

EDGWARE HIGHWAY BOARD, May 21.—For granite, surface hand-picked flints, and double-screened gravel. W. A. Tootell, Edgware.

BATH STONE OF BEST QUALITY.

RANDELL, SAUNDERS, and COMPANY, LIMITED, Quarrymen and Stone Merchants, Bath. List of Prices at the Quarries and Depôts; also Cost for Transit to any part of the United Kingdom, furnished on application to

BATH STONE OFFICE,
Corsham, Wilts.

[ADVT.]

BANKRUPTS.

TO SURRENDER IN THE COUNTRY.

Henry Willis Smith, and Francis Robert Simmonds, Barnes, builders, May 24, at 12.—John Storey, sen., Southtown, Suffolk, carpenter, May 30, at 12.—William Tree, New Barnet, Hertfordshire, builder.

ACT 1869.—PUBLIC EXAMINATIONS.

A. Baker, Ackland-road, Portobello-road, builder, June 16.—J. Hutchings, Binstead, Isle of Wight, builder, May 26.—T. Shaw, Ilkeston, joiner and builder, June 6.—J. and J. J. Vinten, Tunbridge, builders, June 16.

ACT 1861.—SITTINGS FOR LAST EXAMINATIONS.

W. and W. H. Daw, Blechynden-street, Kensington, builder, July 21.—A. W. Gorringe, Church-street, Islington, varnish manufacturer, July 21.—F. James, Lambourne-road, Clapton, builder, July 21.—G. Reeve, Grosvenor-park, Camberwell, builder, July 21.—W. Bloom, Woolwich, carpenter and joiner, July 28.

DIVIDEND MEETINGS.

H. Stuart, Scholes Wigan, engineer, May 20.

DECLARATIONS OF DIVIDENDS.

J. Dawson, Nottingham, builder, div. 5d.—A. H. Leake, Hollinwood, ironfounders, divs. 8¾d. and ½d.

PARTNERSHIPS DISSOLVED.

Kershaw and Joyce, Sheffield, builders.—Salmon and Co., Yarmouth, builders.—Easton Brothers, Wandsworth, builders.

Crystal Palace Company.—To Builders and others.—Crystal Palace Estate.—The Crystal Palace Company are prepared to let on building leases for a term of 99 years, certain portions of their freehold property abutting upon the Penge-road, Thickwood-road, Anerley-road, and Palace-road. Plans and conditions may be seen on application to John Norton, Esq., Architect, 24, Old Bond-street, W., or to Mr. Hart, Accountant, Crystal Palace, Sydenham, S E

A Capital Brickfield to be Let, 17 miles east of London, having railway sidings and a large wharf. Plenty of excellent brick and tile earth, also fine sand and abundance of water. Fixed rent and royalty moderate. Immediate possession. No stock nor plant to be taken. For particulars apply to Messrs. Burder and Dunning, 27, Parliament-street, Westminster, S.W.

To Builders.—To be Let, on Building Lease, FREEHOLD LAND, situate within five minutes' walk of two railway stations, and within ten minutes' walk of omnibus to City and West-end. Improved ground rents purchased and materials advanced.—Apply to Mr. H. A. Alexander, Architect and Surveyor, 16, King William-street, City.

Extensive Wharfage to Let at Chelsea.—River Frontage about 600ft. Also fine Wharfage in the Canal adjoining the West London Railway Goods and Coal Depot, all possessing great facilities for Merchants, Contractors, &c., and may be had on lease in parcels, or offers for the whole be entertained.—For terms, apply to Ashburnham Estate Office, Cremorne-road, Chelsea.

To Contractors, Builders, and Others.—Dry Brick Rubbish can be received at the extensive Wharfage forming a portion of the Ashburnham Estate, Chelsea.—For terms, apply to Estate Office, Cremorne-road, Chelsea.

To Let.—To Builders.—A most eligible Plot of Land, a part of the Ashburnham Estate, having about 240 feet frontage in King's-road, opposite St. Mark's College and the New Streets. The Plot of Ground is enclosed in a Iling Fence 8 feet high, and there is a Workshop of large dimensions, with General Office, well built, and lighted with sashes and skylights. The whole affords every facility for builders. The terms and ground-rents are low. It is within a short distance of Chelsea Station on the West London Railway, and easy of access to Steam Boats. Omnibuses pass within two minutes' walk every ten minutes. For terms, apply to the office, Ashburnham Estate, Chelsea.

To Builders and others. Established 80 years.—To be DISPOSED of, an old established BUSINESS, principally jobbing, in a first-class neighbourhood, 3 miles west of the Marble Arch, capital twelve-roomed house, workshops, and large garden. Held on lease. Rent can be let off if required. For further particulars, apply personally to Mr. J. S. Gomme, Auctioneer and Valuer, 16, Southampton-street, Strand, W.C., and Feltham

Wanted, a Builder's Yard, and WORKSHOPS, with Dwelling House attached, in the N.W., W.C., or N. district.—Apply, by letter, to W. H. C., 22, South grove East, Muswell-hill, N.

To Capitalists and Others.—To be DISPOSED OF by Private Contract an ESTATE, producing a Building Stone of a most superior kind, together with the Quarries now in work, Plant, Lime, and Brickworks, &c.—Address, in the first place, W. T., BUILDING NEWS office.

THE BUILDING NEWS.

LONDON, FRIDAY, MAY 20, 1870.

THE DISMISSAL OF MR. E. M. BARRY BY THE OFFICE OF WORKS, AND THE QUESTION AS TO THE OWNERSHIP OF THE DRAWINGS MADE BY ARCHITECTS.

THESE two questions, although both raised on the present occasion, are and should be considered distinct, as Professor Donaldson properly pointed out to the special general meeting of the Royal Institute of Architects, lately summoned for their consideration. We propose to investigate them each separately, from the point of view of the public as well as that of the profession. It is, however, we think, demonstrable that the interests of both parties in the matter are identical, however diverse they may appe ar at first sight, for neither can permanently gain by what is injurious to the other. The profession exists for the service of the public, and the ingenious notion of its being "a parasite" could only have occurred to the writer of the article on the subject in the *Times* under an entire misconception as to their mutual relations.

To deal firstly, then, with the dismissal of Mr. Barry from what we may term his official position. Whether or not he has held an actual appointment as architect to the Houses of Parliament is immaterial, for it cannot be denied that successive First Commissioners of Works have considered him as such, and have referred to him alone upon every question connected with what Mr. Lawrence termed "the premises;" and, under such circumstances, if he received no salary, all we can say is that he ought to have had one, and certainly ought not to be deprived, as he has been, of the other incidental advantages—not great ones, it would seem—of his official position. It is the universally recognised etiquette among the employers of architects, as among the profession itself, that while anyone is certainly at liberty to dismiss his architect after paying him his just claim for past services, he should be quite off with his old love before he is on with a new one; and no architect of standing would accept a commission from an employer until he had learned that the coast had been thus properly cleared for him. This etiquette, however, Government has in this instance disregarded, for Mr. Ayrton, even while a contract for works was being carried out, called upon Mr. Barry to resign his official position that it might be bestowed upon Captain Galton and his subordinates. It is true that Mr. Ayrton, in his reply to the gentlemen who formed the deputation from the Institute of Architects to Mr. Gladstone, stated that Mr. Barry had not been dismissed, inasmuch as he had held no appointment at all, and that while the Board of Works would assume the ordinary control of the premises, it was still possible that Mr. Barry might be consulted whenever alterations of considerable extent were contemplated. We maintain that Mr. Barry was summarily, and, despite all explanation as to routine, discourteously dismissed from the official position that he (as his father before him) had held as Architect to the Houses of Parliament.

What then, we may ask, is the purpose indicated by the course that has been taken? We think that this is not difficult to discover. It is but a part of the policy emanating from South Kensington, which is to centralise and bring under its control all public buildings and matters relating to architecture and art in the kingdom. The vast heart of Mr. Cole throbs to include within the meshes of his system all principalities and powers within the realm. He means well, and would fain that every child in every school, so that it be a Government one, should be taught what to eat, drink, and avoid, and how to build everything that architects and engineers now lawlessly give their whole lives to achieve. But love is somewhat tyrannical, and no one is to be permitted to get into his fold, but by the doors that he chooses to open. Room, therefore, having been made by the removal of Mr. Layard and Mr. Fergusson, whose posts were made too hot for them, Captain Galton, *of ours*, is inducted to carry out the system, and clerks of works are to be found by the never-failing machinery of competitive examination. This machinery, however, will break down, although the almost superhuman energy of Mr. Cole may float it for a brief period. Yet the scheme, it must be allowed, is clever and comprehensive. The monster amphitheatre at South Kensington, designed and built by a Royal Engineer, will draw all the vocal talent which the upper ten thousand affect, and though the voices of the sweet singers would be as lost in its vast arena as those of a nightingale or two in the groves of Blarney, yet it may empty the opera houses of London and ruin their proprietors for a time. The Royal Academy, thanks to the energetic action of the Institute of Architects—whose remonstrances caused the mile-long galleries that would have swamped all the works of the academicians among the myriads of what are now "rejected addresses" to be taken down—may yet breathe awhile, but the poor little architectural room at Burlington House, as well as its struggling sister-galleries in Conduit-street, may have to succumb before the Perpetual International Exhibition of Everything under the Sun, and within the sunshine of the august Director of South Kensington Museum.

What has the system that has long been at work in a less ambitious manner effected hitherto? How many potsherds of the artistic pottery of Felix Summerly are yet extant? Or, what yet have art manufactures gained by the Government art schools so widely established?

The architectural profession, while it ought to have its eyes open to the real purpose of the raid systematically made against it from this quarter, may smile, knowing well that the utmost result would be the accidental finding and training of a few men fit to become architects, and who would therefore be gladly welcomed by themselves as such, and who would probably have discovered their talents for themselves; and that the other designers and clerks of works, the ordinary material manufactured by such a high-pressure system, will soon settle down to be art workmen, the very hewers of wood and drawers of water that the profession want.

The object of the raid is, as Mr. Cole in his published evidence lately adverted to pointed out, to create a system to do without architects as much as possible, and only to employ them when they cannot be done without. As he kindly suggested, engineers might be employed to make the plans of buildings, and then an architect allowed, under his control, to do the artistic part of the work, the carrying out of which should again best be superintended by the engineer; and Mr. Hunt helps with a further suggestion, that even these few occasional crumbs should be given to the architect, under compulsion that he is to receive only 5 per cent. on the cost, including the work of measuring it up. Were it not evident that the system devised is too clever by half, and must break down, architects might well be alarmed. No one now employs an architect unless he has confidence in him and needs his help, and then seldom, if he is wise, tries to break down that confidence by haggling with him about his fees—so, if the public want architecture, they will still employ men of ability in that art, and engineers and clerks of works will not long, under any system, be asked to do other than their own work; and Captain Galton has already very properly explained that he would not undertake any other.

We now turn to the other question mooted namely, the ownership of the drawings prepared by architects for the buildings they are employed to erect. It has not much relation to the case of Mr. Barry, as he has consented to give Mr. Ayrton all the drawings he needs, or copies of Sir Charles Barry's at the cost of their production; and Mr. Ayrton distinctly told the deputation of architects before referred to that he did not ask or claim all the drawings, and only wanted those that explained the construction of the building, the flues, and the drains. The question having, however, been widely mooted, it will be of great service to all parties that it should be settled once for all. It has been asserted on the part of the public that the drawings having been paid for, they should be delivered to the parties who paid for them. The architectural profession, as a body, assert, on the contrary, that they are not paid for the production of drawings, but of buildings, and the drawings are their tools and remain their property.

The drawings prepared for buildings may be divided into the general working drawings,—made the contract drawings, and detail drawings explanatory of the former. Now, as Mr. Seddon clearly pointed out at the deputation to Mr. Gladstone, the contract drawings ought to be held by the architect during and after the works, as umpire between the contracting parties in case of accident or dispute hereafter; and the detail drawings are, as it were, the instructions of the architect to the contractor, and it would be as reasonable to ask the architect to deliver up his private letter-book as the latter; and seldom among either of the above would be found the character of drawing needed by Mr. Ayrton, setting forth all the flues and drains, as they are never attempted to be shown on contract drawings. Such plans should be made by the clerk of works during the course of the building, and it would be well that copies should always be given to the owner of it, and no architect would refuse to give such.

Now if the profession be correct in asserting that the universal custom hitherto has been for the architect to retain the drawings, why should this be altered now?

If employers, as a rule, do not need the drawings (and we may presume they do not need them, or they would have oftener asked for them), and if Mr. Ayrton, even in this case, does not need them, to please whom should a new custom be set on foot? It would appear that an abstract principle of justice is thought by some persons to be outraged by the custom, but the same obtains in literary and artistic matters. The painter who sells his picture retains his sketches and copyright; an artist who designs illustrations for a book does not thereby sell the drawings made for the purpose. Again, if no one would be benefited by the architect's surrendering the drawings, he certainly might be seriously injured by doing so, for practically their retention is the only means of securing his copyright.

For the usual percentage of 5 per cent. on the cost of a work architects have been in the custom of making one set of drawings, kept by themselves and made the contract drawings, and one set of tracings to be kept at the works for reference and to be used by the contractor. If the contractor needs another set for use elsewhere, he has to take them at his own cost, returning those that are not destroyed to the architect at the conclusion of the works, in acknowledgment of the architect's sole right to the copyright of them, and as he can have no further legitimate need of them. So if the employer needs another set for his use or pleasure, he can always by consent of the architect, never refused, have them by paying for them, and with an understanding that he will not infringe the copyright.

To compel an architect to make more draw-

ings than this established custom requires, without paying for them, would be unjust. It has been said erroneously that if a contemplated building be abandoned, and an architect charge 2½ per cent. for his drawings, that he must give them up. But this cannot be the case, unless he contracted to do so. He was employed to build a building, and would, if he had a proper regard for his reputation, have declined to design one to be executed under other superintendence than his own. If he has done his work—the preparation of the design—and the project be afterwards stopped by no fault of his, he cannot be compelled to do what he never contracted to do—that is, sell his drawings for 2½ per cent. Nor can the employer who has caused him to do the work, the completion of which he himself prevents, refuse to pay the proper value for the work done. A lawyer who has conducted to a similar extent a law case that may be compromised, charges for his time engaged upon it, and does not give up every paper he has prepared for it. We strongly counsel the profession not lightly to concede this point. It may seem hard that in such a case the person who pays gets nothing tangible for his money, and in nine cases out of ten it will not harm the architect to give up, as an act of courtesy, the general drawings of the proposed but abandoned building. It may happen, however, that it would be greatly to the prejudice of the architect to do so, as his reputation might be injured if the employer should proceed to erect the building without his superintendence, and still greater damage would be done him if he were to build not one, but a number from the same set of drawings.

The above seems to us to be the fair and reasonable view of the matter; but we trust, for the sake of the public and of the profession, that it may speedily be settled and set at rest.

Whether or not the question is likely to be tried upon the present issue, we cannot say, as Mr. Barry, on the one side, has conceded all that Mr. Ayrton can need, and Mr. Ayrton has said that the profession has been in error as to the claim he set up, and that he needs no more than every architect would be willing to concede at once. But if the legal advisers of the Crown are to give an opinion on the point, it is only right that they should not pronounce an opinion upon an *ex-parte* statement. Should they do so, however, it will then be incumbent upon the Institute of Architects to take action on behalf of the profession, to obtain a proper legal decision on the subject.

ARCHITECTURE AT THE ROYAL ACADEMY.

(*Continued from page* 351.)

FEELING that the actual handiwork of architects themselves, even if in monochrome, or at any rate of a simpler and less pretensious character than that of water-colour drawings delegated by them to artists, are the distinct and proper works to appear on the walls of the architectural room of the Royal Academy, we hail, in Nos. 762 and 779, views of Leyes Wood, Sussex, now erecting from the designs of R. N. Shaw, two admirable and characteristic drawings of a most picturesque and thoroughly mediævally designed structure. The drawings are etched in pen and ink. Some features, such as the channelling of the chimney stacks, are, in our opinion, carried out to an exaggerated extent, for though we own to partiality for the idea in moderation, these examples of it are indeed "linked sweetness long drawn out."

No. 763 is the Design for the Teatro Massimo at Palermo, Sicily, by W. J. Green—a creditable ordinary decorator's work, with no great originality of treatment.

No. 764, the decoration of Staircase at No. 44, Belgrave-square, by S. Aitchison, is of an entirely different calibre, and shows what may be done by a thoughtful and educated architect towards rescuing even so ordinary a building from commonplace. The several apartments show a variety of schemes of colouring; one is in blue and green, admirably harmonized and relieved with borders of gold and white. Another is wholly of subdued vermilion relieved by black and gold. Another has murrey brown panels with yellow-ochre border, surrounded by another of white with lines on it, and a dado of slate colour, and cornice on a gold ground. Another has walls of primrose colour. The staircase has blue strings and plinth, blue and gold panels, with Pompeian-like figures in the panels with black dresses, and a frieze above has a flight of Japanese-like birds; above is a band of pink, to which, however, we take objection.

Mr. Pearson exhibits some excellent drawings of characteristic and careful works—No. 765, a charming interior of the Chapel of S. Peter's Home, Kilburn, founded by Mr. and Mrs. B. Lancaster; and 785, Interior of the Chancel of S. Mary's Freeland, near Oxford. They present generally the same feeling as that shown in Mr. Pearson's fine work, S. Peter's, Vauxhall.

We are unable to admire 766—Dobroyd Castle, as erected for John Fielden, Esq., from the design of J. Gibson. It is a forbidding, semi-castellated structure, with turrets at the angles and massive central tower, which seem out of harmony with the ordinary windows of the apartments. Mr. Gibson does not seem to us to have successfully blended modern requirements with ancient archæology.

Mr. W. Emerson is an able contributor of a large number of drawings. His work at present is somewhat in the manner of Mr. Burges. His Crawford Market Fountain, Bombay, recalls too closely a design for a fountain formerly exhibited by that gentleman. Still we can only rejoice that so effective and picturesque a design has been carried out. No. 777, the Chancel of Girgaum Church, Bombay, is an excellent rendering of massive French Gothic in a clime for which we should think it suited. We are also thankful to him for his drawing of the Taj-Mahal, Agra.

Sir D. Wyatt sends No. 771, House at Uckfield, Sussex—a moderate-sized mansion, fairly treated. As to grouping and detail, we question the use of bargeboards to gables instead of copings, when all the dressings of the bay windows, &c., are of freestone.

Messrs. Banks and Barry exhibit the Interior of Helmsley Parish Church, Yorkshire, recently restored for the Earl of Faversham. The style is Norman, and though it is difficult to judge what is new and what is old, all seems in harmony.

No. 775 is a grotesque competition design for the New Town Hall, Bradford, by R. Nevill. A low and enormously wide segmental arch for the central entrance looks like a wide distended mouth, and two windows above serve for goggle eyes to correspond; and there is nothing else in this design to redeem this ugliness in so prominent a position.

Below this is another design, No. 778, J. P. Seddon, which is free from such eccentricity, good in detail, and well composed. Not far from these are three large drawings of the design by Messrs. Lockwood and Mawson, of Bradford, which gained the competition, and is about to be carried out. The building is of very moderate excellence and little originality, but is set forth attractively by the drawings. Considering that the result was prejudged, and that the Corporation of Bradford has gained unenviable notoriety by conferring all the three premiums it offered upon fellow-townsmen, it may be congratulated upon the fact that the building might well have been worse.

No. 780 is a design for decoration and fittings of a Dining-room by B. J. Talbert, which is quieter than the published designs of that gentleman, and certainly meritorious.

No. 786 is a view of the new portion of the Château de Martinvael, near Cherbourg, the property of Baron Schickler, by Mr. W. H. White, an English architect settled and practising in Paris. Though open to criticism in detail, it is a striking and picturesque work founded upon Early French Gothic, and is creditable to its designer.

Mr. Street is the largest contributor among the academicians, and, considering the importance of the works he exhibits, may be considered fairly as taking the main honours of the Architectural department of the Exhibition. We have, however, previously described the original competition drawing for the proposed New Law Courts, of which he sends the (No. 788) bird's-eye in his pen-and-ink style of drawing. The breadth of effect gained by the ample roofs from this crow's point of view we could wish realised from the citizens' in the executed work. The later design for the same buildings on the Embankment is from such a point as it could really be seen from, and, full of fancy and merit as it is, lacks that breadth and consequent repose, and, considered as in juxta-position with Somerset House, would, we fear, have that want heightened by the contrast of that building. We trust Mr. Street will bear in mind, in his actual work, that such quality is an essential—nay, the first characteristic in a grand public building. Mr. Street also sends views of two towers of new churches of his—No. 808, S. John's, Torquay; and 818, S. Peter's, Swinton, near Manchester—both bold and picturesque, but sundry whims in the shape of pinnacles between the belfry windows and gablets on buttresses might be dispensed with advantageously.

Mr. Kerr sends a chimney-piece and buffet of dining-room, Bearwood; though hung too high for inspection, they seem good, but not particularly striking or original.

No. 792, S. Peter's, Blackmoor, erected for Sir Roundell Palmer, by A. Waterhouse, is a clever drawing of a building, which is good in outline and moderate in detail.

Mr. E. M. Barry sends No. 794, Design for a New House of Commons, and increased accommodation connected therewith, in which a difficult problem is ably treated as regards plan, with detail hardly up to the mark of that of the Houses of Parliament. No. 804, a good drawing, said to be by Mr. Smallfield, of the interesting Restored Staircase of Crewe Hall; 803, a Villa near Egham; and 773, Thorpe Abbotts, Norfolk—additions and alterations.

Mr. J. Bury sends No. 799, View of St. Barnabas Church, Cambridge, now in course of erection.

No. 805, the Royal Mausoleum at Frogmore, is a beautiful drawing by Mr. H. W. Brewer.

No. 806, Bayham Abbey, erecting for the Marquis Camden by Mr. D. Brandon, is an Elizabethan mansion of fair character.

No. 811, the Charing-cross Branch of the Union Bank, by F. W. Porter, disappointed us, considering its important site at the corner of Spring-gardens.

Far better, and a highly-wrought-out Classic work is No. 813, New Consulate Buildings at Alexandria, by J. W. Wild, whose name we are glad to see again as a contributor.

Mr. F. P. Cockerell's fine drawing we could wish to be expended upon a better design than that of No. 814, a Marble Chimney-piece.

Reviewing the collection as a whole, we think the drawings are easily divisible at a glance into those which are the handiwork of the architects themselves, and those which have been, as it were, manufactured for them. It is needless to say that far greater interest is attached to the former, and that their intrinsic merit is the greater. We do not mean to say that an artist cannot make a better drawing of a building than an architect if he sets the right way to work; but representations of buildings, trees, hills and foregrounds, omnibuses, cabs, and horseguards, are of little value if not carefully copied from

nature. Those drawn from memory, or invented from inner consciousness, are naturally an offence to the sense of painters when set beside their own very different class of work, and they are an offence also to the public. If we are to have conventionality it should be of the proper kind—the art of shorthand that an intelligent architect invents for himself to express his designs. The present collection under discussion contains not a few of such appropriate and thoroughly conventionally-treated drawings, and which are worth studying as such. We can see that those exhibited by Messrs. Street, Shaw, Cockerell, Seddon, Waterhouse, Aitchison, and Edis, are of this description, and their varied styles are interesting to examine and to compare—Mr. Street's with Mr. Shaw's, for instance; the work of the former is always piquant, effective, and popular, but we question if it be as pure and realistic as that of the latter, for the one almost disguises the detail, while the other more clearly explains it.

Of the other style of drawing we have referred to, perhaps Messrs. Lockwood and Mawson's are the most striking examples. They are essentially of the class manufactured in deference to the supposed requirements of competitions, and though they compel attention, do not give equal satisfaction when examined.

The artists who lend themselves as assistants to architects to colour their drawings should, if they would maintain a high character for their work, be constantly refreshing their minds by painstaking painting from actual buildings and from nature, and should have their folios well stocked with accurate studies of the scenery and figures which they expect to employ as backgrounds and foregrounds for their works; for, as the carefully-outlined perspectives put into their hands are generally far more detailed than the trees and shrubs they place before them, if the latter be daubs they will seem all the more dauby by the contrast. Mr. Brewer, for one, we know is continually engaged in making careful drawings in the towns of Germany; and we would counsel him to continue the practice, and others to follow him if they propose to colour perspectives. Architects who employ artists may, it is true, by close supervision, get from them what they need, and they know themselves and can explain what it is. It is by such means that the effects Mr. Burges presents us with are attained; but it is not given to all in the profession to be able so to direct and control the work of others, and it is not all artists who are willing to be controlled, and some are cramped and their work spoiled by the endeavour to make them so run in harness.

Another curious fact forced upon the mind by the examination of these architectural designs is the continually waning influence that Classic and Italian architecture seems to exercise. Three-fourths of the designs, and nearly all the prominent and promising ones, are Gothic, and the latter style alone seems to have any attraction for the younger rising men. We are content to note the fact, and to remark that, though we would rather that one feeling swayed one generation, and have little faith in a too eclectic age, constantly wavering between rival styles, we think that even Gothic architects would do well to study the refined works of ages before the restless energy of mediæval Europe introduced the system which now finds almost too exclusive favour.

NEW MUSEUM AND LIBRARY AT GUILDHALL.

IT is not everyone of our readers who is aware that there exists at Guildhall a valuable library of books treating of subjects connected with the City of London, and a most interesting collection of antiquities that have from time to time been discovered within the City and its surroundings. It will be readily understood that such collections receive considerable additions each year, consequently the present library and museum are found absolutely insufficient for the purposes they were originally intended to serve. A large piece of ground at the east of Guildhall, fronting on Basinghall-street, has therefore been bought for £40,000 by the Common Council, and a number of men are at present engaged in excavating the site. Tenders have not yet been received. It is therefore impossible to estimate with anything like accuracy the cost of the works. If it be kept in mind that Guildhall runs east and west, and that the new museum, with library above, runs north and south, separated from the east end of Guildhall by a court about 20ft. in width, and that the new structure may be approached from Basinghall-street, and also by means of a noble corridor from the present porch of Guildhall, a good general idea of the work will be conveyed. The floor of the museum will be on the level of the crypt of Guildhall, and therefore reached by a flight of seventeen steps. The approach from the porch of Guildhall is the principal one, consisting of a corridor 54ft. 6in. by 21ft. 6in., with a side door opening on the dais and by means of a flight of nine steps, 26ft. 6in. wide, leading to level of the library. The proportions of this corridor, vestibule, and staircase are imposing. On this level are the library, 98ft. by 65ft., a public reading-r oom 50ft. 6in. by 23ft. 6in., a committee room 32ft. by 20ft., a hall 23ft. by 20ft., and a grand staircase 24ft. 6in. square approached from Basinghall-street. The museum is 82ft., by 65ft., and 89ft. high. The library is nearly 50ft. high to centre of ceiling, which is low pitched and open, tie beam with arch under, all of oak and very solid in appearance. On each side are seven bays, and in these the books are kept. The whole is like a church, with aisles, or rather side chapels, forming the bays, and having a clerestory over. The width between the piers is about 35ft. The bays are 14ft. square. There is nothing unusual in the plan, for the simple reason that the best form of library has been long known, and that it cannot well take any other shape than that of side bays opening out to a central hall, which in most cases is provided with large tables for the accommodation of works of unusual size, two or three of which open at once would be too large for any table that would be placed in the bays. The law library of Dublin, the Astor library of New York, containing the most valuable collection of books on the Western continent, the library of the Patent Office in Southampton-buildings, and many other libraries, are constructed in this manner, so that we cannot see any great elaboration in the scheme which Dr. W. Sedgwick Saunders is said to have elaborated. Did the Dr. ever elaborate the scheme of egg sucking? Of the way in which Mr. Horace Jones, the City architect, has treated the room, we must speak in the highest terms. It is admirably adapted to its purpose, being light and lofty. It is stately in its proportions, and harmonises with rather than absolutely matches Guildhall. Mr. Jones has wisely avoided the mistake of using a contemporaneous style in a work of manifestly later date than the original building, and he has refrained from obtruding on the public the fact that he has studied the works of Viollet le Duc. This fine apartment will be used on great occasions as a reception room, and the reading-room as a ladies' room. Visitors of great distinction would approach from Basinghall-street, from motives of convenience of access, though the finest approach is certainly from the Guildhall porch, through the grand corridor. The basement needs little description. It is enough to say that under the grand corridor, vestibule and hall, fire-proof strong rooms are provided, that there is a minor museum 30ft. by 20ft., and that an opening is provided into the Guildhall crypt. This latter it is proposed to make as light as may be, and to put it, if possible, to some better use than a receptacle for lumber. We had almost forgotten to mention that on the library floor the ladies are provided with a reading-room, and that the reading-rooms will be literally free to the public. That this will be a boon to many, anyone who has visited the library of the Patent Office can bear testimony. With regard to the elevations only two can be seen—that on Basinghall-street, and the north end of library fronting on a new passage at the side of Cooper's Hall. The style of the elevations deserves notice. It may be described as Collegiate Tudor. The parts are bold, and the treatment broad enough to satisfy anyone There are neither pinnacles, cresting, nor vanes. There is no fussiness—in short, no over decoration, and the modern Gothic buildings of which this can be said are few indeed. There are, it is true, three niches on the Basinghall-street front, but they are large, and the statues life size; they represent men, not mannikins. The bay window, occupying the entire nave of the library, is a fine feature, and the other windows are satisfactory in every respect. There is a pierced parapet, which is sufficient for its purpose of finish, and the chimneys are plain, as chimneys should be. Rich, as befits the civic library and museum of the richest city in the world, it does not proclaim lavish expenditure. Its character is the expression of substantial wealth, and the old Guildhall, dear to Londoners, will, we are sure, have no reason to feel otherwise than proud of the companionship of its handsome offshoot.

ON EARLY CHRISTIAN ART.*

PART I.

WE now come to the most important point in the history of mankind—the foundation of Christianity, which undoubtedly was the greatest event in the development of humanity, next to which may be counted the great migration of northern people. In tracing the path of the progress of the civilisation of humanity, we generally state it to have followed a line from east to west; if, however, we intend to be strictly accurate, we ought to say that it extended from south-east to north-west. In dividing the globe into halves, we perceive a line of demarcation between the northern and the southern hemispheres. In accordance with the teachings of physical geography, the higher kinds of animals are found in the northern half, and the lower in the southern hemisphere. Art has developed in analogy to this physical division, and we can trace a distinction even between the art of the northern and southern portions of the northern hemisphere. We find that in the south-east the static or moral power has been more developed than the intellectual. Art in the south-east was regulated, and over-regulated, by all sorts of theocracies and hierarchies, and remained, after a certain period of progress, stationary. The predominant static force, mixed with an ill-regulated imagination, drove man on the field of metaphysical speculation. The south-eastern part of the northern hemisphere of the then known world was thus the birth-place of all sorts of religious systems—pantheism, theism, idolatry, zoolatry, astrology, alchemy, symbolism and mysticism, rock-hewn temples and catacombs, magic, and cabalism—all originated in the south-east. The dynamic force of humanity, with a tendency to regulate itself by a moral force, was prevalent in the north-west, and we received in olden times philosophy, as well as art in the highest perfection in architecture and sculpture, from the Greeks; and all the sciences which through their beneficial influence have promoted the welfare and progress of humanity were fostered in the north-west—such as geography, history, astronomy, chemistry, botany, zoology, physiology, anatomy, geology, cosmogony. I have tried to show you the slow growth of art in savage life; beyond ornamentation with geometrical figures the savage has never succeeded; he could neither reproduce animals nor the human form. I have pointed out to you a further progress in Egyptian art. Architecture with the

* Abstract of a Lecture delivered by Dr. Zerffi, at the South Kensington Museum, April 12, 1870.

Egyptians became monumental, but their sculpture remained undeveloped. Sitting figures have their legs and thighs forming right angles in the side view, while in the front the legs are parallel to each other; the drapery is close, and rarely interrupted by folds. In their historical or allegorical bas-reliefs, the composition is devoid of elegance or choice, but the Egyptians already show a remarkable correctness in drawing animals. Indian art shows further progress; the mythology and poetry of the people furnish them with a variety of subjects, with which the walls and shrines of their temples were covered. In Indian architecture there is grandeur combined with a certain degree of harmony. The human form is rendered with ease, the proportions are more correct than were those of the Egyptians, and the sensual beauty of some of the figures is striking and natural. A further step in advance was taken by the Persians in the construction of their palaces. The Chinese always remained wood or ivory carvers; they imitated flowers, but there is an uncouth stiffness about everything they do, and in that which is with them of a better appearance foreign influence is undeniable, Greece alone was capable of reaching the very highest climax in architecture and sculpture, and I have pointed out the reasons why. I must once more draw your particular attention to the fact that Greek art reached its highest perfection only at a time when the forces of moral sentiment and intellectual progress were, as far as possible, balanced; when sculptors and architects wished to convey, by means of outer forms, moral lessons, the worship of the gods, and an admiration of the harmony of God's most beautiful creature, man. So long as this was done in a spirit of earnest reverence, art progressed and became more and more divine; but as soon as the balance between the moral and intellectual forces was lost, and the craving for sensational excitement took hold of the mind of the Greek artist, the sensuous was introduced, and Greek art degenerated; with justice and modesty, sublime beauty, the essence of Greek works vanished. The Romans concentrated all their intellectual and moral forces on politics, and sunk by degrees lower and lower, till all and everything, science and art—nay, the very existence of human society, was transformed into one great chaos of inextricable blank despair. Man was either at war with reality for a beggarly existence, or entirely given up to mere sensuous enjoyment. On both sides, man came to an open rupture with his real destiny, and humanity would have perished altogether in sin and iniquity had not a divine power mercifully interposed, freeing "the inner man," and thus preparing humanity for a higher spiritual life. The north of Asia went through the same phases of religious development as the farthest south. With all the apparent analogies between Buddhism and Christianism, there is an immense difference between the two religions, and that this is the case is clearly proven to the historian by the diametrically opposed developments which humanity attained under them. Buddhism taught not to kill, not to steal, not to commit adultery, not to lie, not to be drunken; Christianity teaches the same. Twelve farther ordinances of Buddha extol poverty, command to live on alms, to meditate nightly amongst the tombs on the transitoriness of all human things. Poverty, self-abnegation, and abstinence were cardinal virtues with the early Christians; but Christ reconciled and emancipated our spiritual nature, and brought it into vivid activity, whilst Buddhism destroys this our highest nature, degrades it as not existing, or turns it into a negation of all that is assumed to be real. The Greeks said, "Man, know thyself," but they reached only the form of harmonious beauty. Intellect to the Greeks was unintelligible if it was not clothed in a beautiful form; only in such a form had humanity any value for them. The Romans cared for property, for possession, for temporal power. Man as such was recognised by them only so far as he could acquire wordly goods and chattels—as far as he had, speaking in our language, "a good balance at his banker's." The Roman counted only as something if the State recognised his entity. His office or his estate in the State was his entity; without such office or estate he was a mere negation of his own self, a discordant being endowed with desires and aspirations which he could not satisfy. The Jew of those times was the only one who felt the wretchedness of his individual nothingness, and hoped and yearned for a redeemer, but he only hoped for a great king who would give him back his national independence, his greatness, his supremacy over all the other nations of the earth. Misery with the Jews was not indifference to all higher sentiments, as with the corrupted Greeks; nor the gloomy despair of an exhausted State body, as with the Romans, nor a blind immersion into an incomprehensible *trimurty*, as with the Brahmans or Buddhists. It was not Stoicism, teaching that the negation is not—that happiness depends on assuming that its absence is no misfortune. The Jewish feeling recognised the reality of this world in the very highest degree, and wished a reconciliation and harmony for every chosen Jew within that sphere. His life was based on the great Oriental principle of the unity of nature, with one Essential Being ruling everything. Christ found humanity in this condition—the sense of beauty of the Greeks turned into licentious worship of the sensual; the Egyptians sighing under their Roman taskmasters, long living without a distinct faith, without their all-powerful priesthood; the Jews divided into quarrelling sects, sunken in religious formality or indifference, hating everyone around them, and being hated by everybody in return; the Roman world tremblingly kneeling before an imperial human being as before a divinity; slaves and poor looked upon as mere burdens on society; the rich debauched, merciless, weltering in amusement; suicide and infanticide, murder and incest, despair and annihilation, everyday occurrences. At such a period resounded Christ's divine words of love; in such a world he died, out of love, sealing with his death the one great truth that we are all children of one Father who is in Heaven. The God of revenge, of jealousy, suddenly turns into a God of love; the God of persecution who punishes the sins of the fathers unto the third and fourth generation, is changed into a God of mercy and forgiveness, rejoicing over one fallen and repentant sinner more than over ninety-nine just ones. With the Jew and the Roman he only was blessed who had plenty on earth; now the poor are blessed. Slaves become masters, the rich man nobody unless he has a pure mind, for the pure mind was to be the domain in which God was present. It is no more a burning bush, or thunder-and-lightening, a volcano, an ark, or a temple. The ark of the new covenant is to be man's loving and forgiving heart. The great Roman conquerors, with all their triumphal arches and their splendid palaces and columns, are hurled from the very heights of their grandeur, for Christ proclaims, "Blessed are the peace-makers." There is, therefore, something better and more glorious than to conquer, viz., to keep the peace. The persecuted and the suffering are exalted, for the kingdom of heaven is theirs. Christianity repudiates local gods, and does not require the destruction of any animal as a sacrifice, nor the juice of any plant as an offering. Christ does not prescribe any diet: He does not allow polygamy; does not order tooth for tooth, eye for eye; does not promise plenty on earth; does not make the people answerable for the sins of their kings, nor the sons for those of their fathers. Christ proclaims the ever-true doctrine of peace, and love, and tolerance. This doctrine is as universal as intellect, must be of as divine origin as intellect itself is, and can be the only faith which will once for ever unite humanity into one great loving and beloved brotherhood. What a change!—not a change only; this is the building up of a new and glorious future; this is the establishment of a perfect balance of the two forces working in humanity; this is and was the everlasting law under which humanity unconsciously developed from the very first beginning of its existence. The sanctity of the human body, whether beautiful or not, is proclaimed and enforced; exposure, neglect, murder of children—so common with the Pagans—becomes a deadly sin. The combats of gladiators are condemned; the amphitheatres lose their cruel interest, and are deserted; and the huge and magnificent marble buildings crumble into the dust as so many monuments of human perversity. In counteraction of Roman and Oriental licentiousness, chastity and simplicity of life are decreed to be of paramount importance. Our moral nature, tending upwards, receives a new impulse through Christianity. Though all religions that have truly governed mankind have done so by virtue of the affinity of their teaching with this our better, our more exalted and sublime nature—by speaking to our moral, by appealing to the divine element of self-sacrifice which is latent in every soul—none has done this to such perfection as Christianity, because it brought into action all our intellectual faculties. Carlyle states:—"It is a calumny to say that men are roused to heroic actions by ease, hope of pleasure, recompense, sugar-plums of any kind in this world or the next; in the meanest mortal there lies something nobler. The poor swearing soldier, hired to be shot, has honour of a soldier different from drill, regulations, and a shilling a day." This nobler nature has been freed by Christianity. It gave the humbler virtues, for the first time, the foremost place in the moral code. The servile classes answered to this appeal to their better nature; slavery, that curse of the Pagan world, was at least abolished in principle. The first and grandest edifice of Byzantine architecture in Italy, the noble church of S. Vitale, at Ravenna, was dedicated by Justinian to the memory of a martyred slave. Charity—a judicious charity—was introduced by Christ. The Romans, it is true, also distributed corn, but their charity, being merely a political device, had no humanising influence upon the people. It became a direct and overwhelming encouragement to idleness. To counteract this kind of charity we find that in the fourth century, a Roman lady named Fabiola founded the first public hospital, and the charity planted by that woman's hand overspread the world. Such institutions were altogether unknown to the Pagan world. The Indians have hospitals for old cows and sick monkeys, but none for human beings. Whilst strangers were sacrificed to Pagan gods if they ventured on an unknown shore, *xenodochia* (refuges for strangers) were constructed all over the Christian world. To attend the sick and afflicted became one of the most important laws of Christianity. During the pestilence that desolated Carthage, 326 A.D., and Alexandria, under the reigns of Gallienus and Maximian, Pagans fled; Christians rallied round their bishops, cheered the last hours of the sufferers, and buried the abandoned dead. "The history of Italy after the fall of the Empire became a monotonous tale of famine and pestilence, starving populations, and ruined cities, but everywhere amidst the chaos of desolation we may detect the majestic form of the Christian priest straining every nerve to lighten the calamities around him." During the darkest period of the middle ages, monks founded a refuge for pilgrims amidst the horrors of the Alpine snows. A solitary hermit often planted himself with his little boat by a bridgeless stream, and the charity of his life was to ferry over the foot-sore traveller for a pittance, or more generally for a mere "God bless you!" That such a new moral state of society at large must have produced a new kind of art, with altogether new forms, is obvious. The first form in which Christian art-ideas were clothed was Pagan. The new wine was put into the old bottles till it burst asunder the decaying vessels, and issued forth in a new life-giving stream of art in two principal directions—in the East as the Byzantine, and later, in the south of Europe, as the Romanesque style. In the Early Christian age the antique forms of the Romans were still of necessity used. In the beginning Christianity appears to have been relegated to the catacombs—subterraneous gloomy winding caves used as burial places by Egyptians, Assyrians, Persians, Greeks, and Etruscans. Excavated rocks have been in all places of primeval civilisation the abodes of the dead. These catacombs are principally found in the environs of Rome and Naples. The most important at Rome are those of S. Sebastiano, S. Calisto, S. Lorenzo, and S. Agnese. Their inscriptions seem to go back as far as the second century. The metaphorical representations, however, belong to the fourth and fifth centuries. At Naples we have those of S. Gennaro de Poveri, S. Maria della Sanità, and S. Maria della Vita. Those at Rome have been calculated to be about 750 English miles long. They are narrow passages, like the shafts and pits of a mine, broken into the black porous tufa, only high and broad enough to admit one person at a time, and with hollow niches in the walls for the reception of the bodies of the dead. Martyrs and bishops received larger tombs, the walls of which were here and there decorated with simple paintings, and with the first symbols of the Christian religion. At certain points the winding crossing passages are broken by more spacious and loftier chambers, with vaulted roofs and niches, and the walls and ceilings decorated—evidently chapel-like structures designed for religious service. The homely simplicity of the early Christians, the sincerity and purity of their ideas of God, and their consciousness of the nothingness of all

earthly things if without a higher moral and intellectual aim, could not be more distinctly expressed than in these quiet and secluded burial places. What a contrast this gloomy subterranean life of the Early Christians, with their parables, their mysterious signs, their rude art, heightening the severe and earnest character of the first abodes of Christianity, to the splendour of the basilicas when Christianity became the established religion of the Roman state! Heathen temples were then turned into great churches, as is evidenced by the Pantheon and the Church of Maria Egiziaca, at Rome. The persecutions to which the Christians were exposed were in the beginning not strictly religious, but rather political, for the Romans, more especially the rich amongst them, were too indifferent to any form of religion to persecute it. The first attempts at art by the Early Christians are even savage, but are interesting as showing the change at once produced by Christianity, even in the customs of life. In the catacombs a picture has been discovered representing the Agape, or Christian love feast. The table is of the horse-shoe form, not precisely like that in the triclinium, though somewhat similar. On it are placed a goblet, bread, and a lamb. The goblets are of the Egyptian form. Bread, as the staff of life, was used generally by all religious sects. The guests are seated at the table, not reclining on couches, and women are represented amongst them as partaking equally with man in the feast of love. These love feasts took place at night, when the Christians could meet together unobserved, bringing with them whatever food they had and sharing it in common. The Christians were accused of perpetrating the greatest crimes at these feasts. It was said they sacrificed and partook of the flesh of heathen children, which accusation, first spread about by Jews, recoiled on them during the Middle Ages, when they were said and believed to feast on Christian children at the time of their Passover. Such monstrous accusations are usually forged when prejudice and ill-feeling, aroused by religious hatred, seek to stir up the ignorant against any dissentient sect. In the picture named we may see that something has grown up which worked a radical change—not like one form of philosophy succeeding another; not like Plato starting some new hypothesis to be discussed in the schools, and followed in its turn by a fresh theory of Aristotle; but a something which has penetrated to the very spirit of humanity, and changed everything in life and art. Thus art has helped to promote a spirit of tolerance, for the real artist is at the same time the real Christian. Through his sense of beauty he accepts everything as beautiful, wherever he finds it, just as the real scientific man accepts everything as true if proved by facts.

EXPERIMENTAL TEST OF THE LAWS OF THE DEFLECTION OF BEAMS.

AT a recent meeting of the American Association for the Advancement of Science, a paper was read by Professor W. A. Norton, of New Haven, entitled "The Laws of the Deflection of Beams Exposed to a Transverse Strain Tested by Experiment." The laws of deflection are of such fundamental importance in mechanical construction, that our knowledge of them can neither be too full nor too accurate. While, therefore, we cannot make room for the whole of Professor Norton's paper, we will endeavour to give an idea of the experiments from which he derives his conclusions, and a summary of the conclusions themselves.

The experiments were made upon sticks of white pine of various lengths from two to six feet, and various breadths and depths from one inch to four inches. The details of the apparatus are unimportant, save that they should be such as to secure accuracy in the experiments. On this head we will say that so far as we can discern from the minute account given, the apparatus was without any defect that could lead to possible error.

The strain was applied by a screw, the pressure of which was measured by a Fairbank's spring dynamometer, and the results obtained were confirmed by repetition with a second set of sticks

Professor Norton, starting with the received theoretical formula for the deflection of beams of a rectangular cross section of uniform dimensions, $f = m \frac{P l^3}{E b d^3}$, in which m is a constant, P the power applied, E the modulus of elasticity, l the length, b the breadth, and d the depth of the stick, deduces therefrom a formula for the case of a beam resting freely on two supports and loaded in the middle, to which the experiments were entirely confined—*i.e.*, $f = \frac{P l^3}{4 E b d^3}$. If this formula be correct, then the following laws must be true:

1. The deflection is directly proportional to the pressure.
2. It is inversely proportional to the breadth.
3. It is inversely proportional to the cube of the depth.
4. It is directly proportional to the cube of the length.

He then gives tables of experimental results, which show, first, that the deflection is only approximately proportional to the pressure, strictly speaking, increasing according to a less rapid law. He suggests as the probable explanation of this discrepancy between theory and fact "that as the force of pressure increases the neutral axis of the cross section of the stick shifts its position, and its distance from the centre of gravity of the cross section augments as the pressure becomes greater. From this cause the moment of the resistance to flexure increases indirectly with the pressure, at the same time that it increases directly from the augmented strains of the fibres. The increased moment of resistance to flexure resulting from this shifting of the neutral axis should be attended with a diminished increment of deflection for the same increment of pressure."

The second law was verified by the tests, if we except such errors as may reasonably be ascribed to differences in the moduli of elasticity of the different sticks, the shifting of the neutral axis in the case of sticks most strained, and possible errors in observation.

In testing the third law the calculated were all less than the observed deflections; but the errors became smaller as the sticks were increased in length. Professor Norton therefore concludes that "the deflection decreases according to a less rapid law than the inverse cube of the depth."

He also concludes, from the results obtained in testing the fourth law, that the deflection increases according to a less rapid law than the cube of the length.

Following these conclusions by a train of reasoning as to the true theory of deflection, which we pass as too abstract for the general reader, he arrives at the formula—

$$f = \frac{P l^3}{4 E b d_3} \left(4 E C \frac{d_2}{l^2} + 1\right).$$

in which f represents the flexure, l length in feet, b breadth in inches, d depth in inches, P pressure, C and E constants which must be determined by experiment. This formula is not easily translated into common language, so as to be understood by the general reader. The engineer, accustomed to regard the laws of flexure as settled will, however, regard it with interest.

MR. AYRTON AND ARCHITECTS' DRAWINGS.

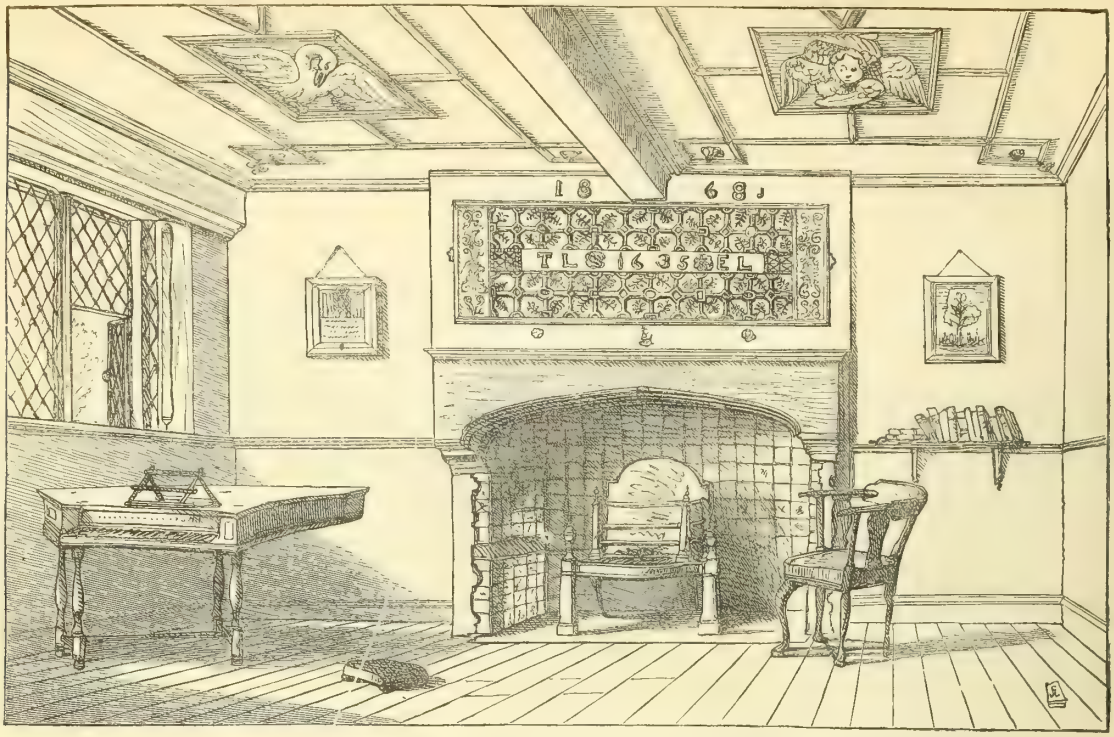
MR. AYRTON, in his reply on Friday evening to the motion of Mr. Cowper Temple, is reported to have said that in the case of the new buildings now in progress at Burlington-house, Messrs. Banks and Barry, the architects to that work, acquiesced in the Department of Works retaining all the contract drawings in their custody. Messrs. Banks and Barry wrote to the *Times* that the reverse was the case, the fact being that the contract drawings having been signed and the contract executed by the contractor at the Office of Works, the drawings were retained there, not with their acquiescence, but, as correspondence would show, against their strong protest that such retention was unusual, embarrassing to them, and detrimental to the public service, inasmuch as the buildings would have to be, and are being, executed from tracings, instead of from the original drawings, which are likely to be more accurate and exact than copies.

Mr. Edward M. Barry also writes to the *Times* to contradict a statement which he thinks is made in that journal. That is, that Mr. Ayrton, wishing to employ Captain Galton in Mr. Barry's place, finds it impossible to do so, because the latter withholds the drawings required. "How far," says Mr. Barry, "I am fairly liable to this charge readers of my former letters can decide for themselves, but I am not aware that Captain Galton is in want of any information. If he is, and if I can furnish it, I can only say that I shall be most happy to give it to him at any time, with the courtesy due from a professional man to a distinguished member of another profession. With reference, however, to the alleged absolute necessity for an architect or an engineer being furnished with working drawings of an existing building before he can alter it or add to it, I may state, from a tolerably large experience, that in no single instance have I ever been supplied with such drawings, nor have I ever found their absence any hindrance to my professional work. As regards plans of the drains and flues of a building, I invariably furnish such documents to my clients if desired, and if Mr. Ayrton's request had been of this limited nature no difficulty would have arisen respecting it, though from the numerous alterations of flues, &c., which have been made in the building without communication with the architect he would have found that it was not in my power to give him as much information about them as I could have wished. I have no claim to speak on a legal question, and it may possibly be right that an employer having paid his architect a sum agreed on for the finished result of his labours becomes *ipso facto* the owner of all the drawings, sketches, and papers of the latter, notwithstanding that the architect did not consider them a part of the bargain, and made no provision for being paid for them when agreeing to the customary terms of remuneration. The custom of the profession shows, however, that this contention is at least a new one, and it seems to me it might be held to justify a similar demand on the contractors for the ladders, scaffolding, models, and building appliances used in the erection of the building for which he had been paid. Certainly, the possession of these things would often be very convenient to the employer."

"F. P." writes from the client's point of view:—"About six years ago," he says, "I employed an architect to make plans for the conversion of a chapel into a Gothic church. For this and some other work I paid him £58 13s. I was unable just then to carry out my intention of remodelling my church, but I wanted to have the plans. This the architect refused, and refused curtly, saying that they must be deposited in some architectural collection. Beginning now to see my way clear to carry out the intended alterations, I wrote to this architect requesting the plans. His answer—would you believe it?—is that he has destroyed them, that I don't understand the question, that they do the same thing at Glasgow, at Paris, and at Vienna, that he has been personally concerned in the late discussion, and that he has seen Mr. Gladstone. Much good may it do him! But I want the plans which he has destroyed, and for which I paid. Surely, at least, he might have had the courtesy to consult me before destroying them.

"G. W. B.," writing to the *Morning Advertiser*, asks, "What would the nation or the F.S.A.'s (?) say if the whole of the drawings of the Houses of Parliament were placed open for inspection, and upon examination it was found that the drawing of the most value as a referential drawing was made by a plasterer's apprentice, seventeen years of age? I confess I do not think such would be the case, but such is a fact as far as one London public building is concerned. I allude to the Coal Exchange, a building opened by the late Prince Consort with great Royal and civil *éclat* in 1849. Upon the completion of that building, a blacksmith's apprentice, seventeen years of age, suggested to his masters (Messrs. Dewer, of Old-street, S. Luke's, contractors for the ironwork of the Coal Exchange) the utility of a sectional drawing true to a half-inch scale. As a referential drawing, they gave him permission to make it in a stable (not in a nice warm architect's office) during a severe winter: no fire allowed to warm his hands but a smith's forge. He succeeded so successfully in his self-imposed task that upon its completion and its being shown to the late Mr. Bunning, the then City architect, he was astonished, and said that the City did not possess a drawing of the Coal Exchange to equal it in value, and that it was a pity the hand that made it should be put to hard work. The drawing was framed at a cost of £6, and was presented to Mrs. Bunning, and it is now hanging in the Architect's Office, Guildhall, a proof that the late Mr. Bunning, F.S.A., considered that the proper custodians for the drawings of a building were those to whom the building belonged."

NEWCOMIN'S HOUSE, DARTMOUTH.*



CHIMNEY PIECE AT WHICH NEWCOMIN SAT WHEN HE DISCOVERED THE STEAM ENGINE.

THE claims of Newcomin on our remembrance, as the inventor of an engine that was used with considerable success long before the birth of Watt, are but little recognised. His own townsmen appear to share the general apathy, and the sole memorial of his labours would have perished in 1864, but for the single-handed energy of one gentleman. The house in which Newcomin lived when he invented the steam engine was formerly situate in Lower-street, Dartmouth, but was sold and taken down in 1864 by the Local Board of Health. Mr. Thomas Lidstone, a builder of many years' standing, and the representative of a building firm established in Dartmouth for more than a centutry, purchased the materials, and, incorporating them with remains of ancient wood and plaster-work saved by him from destruction during a practice of upwards of a quarter of a century, re-erected the house in another part of the town, as shown in the engraving we reproduce from his book. In the sitting-room—the engraving of which we also reproduce—Mr. Lidstone has carefully replaced the clavel, or wooden lintel, of the fireplace at which, according to popular tradition, Newcomin sat when he first noticed the effect steam produced on the lid of his tea-kettle. We think Mr Lidstone deserves a very considerable amount of credit for his conduct in this matter. Apart from any association with Newcomin, his house well deserved preservation on account of its architectural character. In Dartmouth, as in, many other places, such houses are, needlessly disappearing—the old Butter Row, which we illustrated in a recent number, being nearly the last remnant of this formerly picturesque town. The efforts, therefore, of conservators such as the author of the work before us should receive due acknowledgment, and we congratulate the people of Dartmouth on the disinterested efforts of one of themselves to preserve the memory of a townsman, and Mr. Lidstone on the record of his labours, as it comes to us in his handsome, though quaintly got up book.



NEWCOMIN COTTAGE, DARTMOUTH, AS RESTORED.

*"Some Account of the Residence of the Inventor of the Steam Engine," by Thomas Lidstone, of Dartmouth. London: Longmans.

CARTOON FOR TEMPSFORD HOUSE.

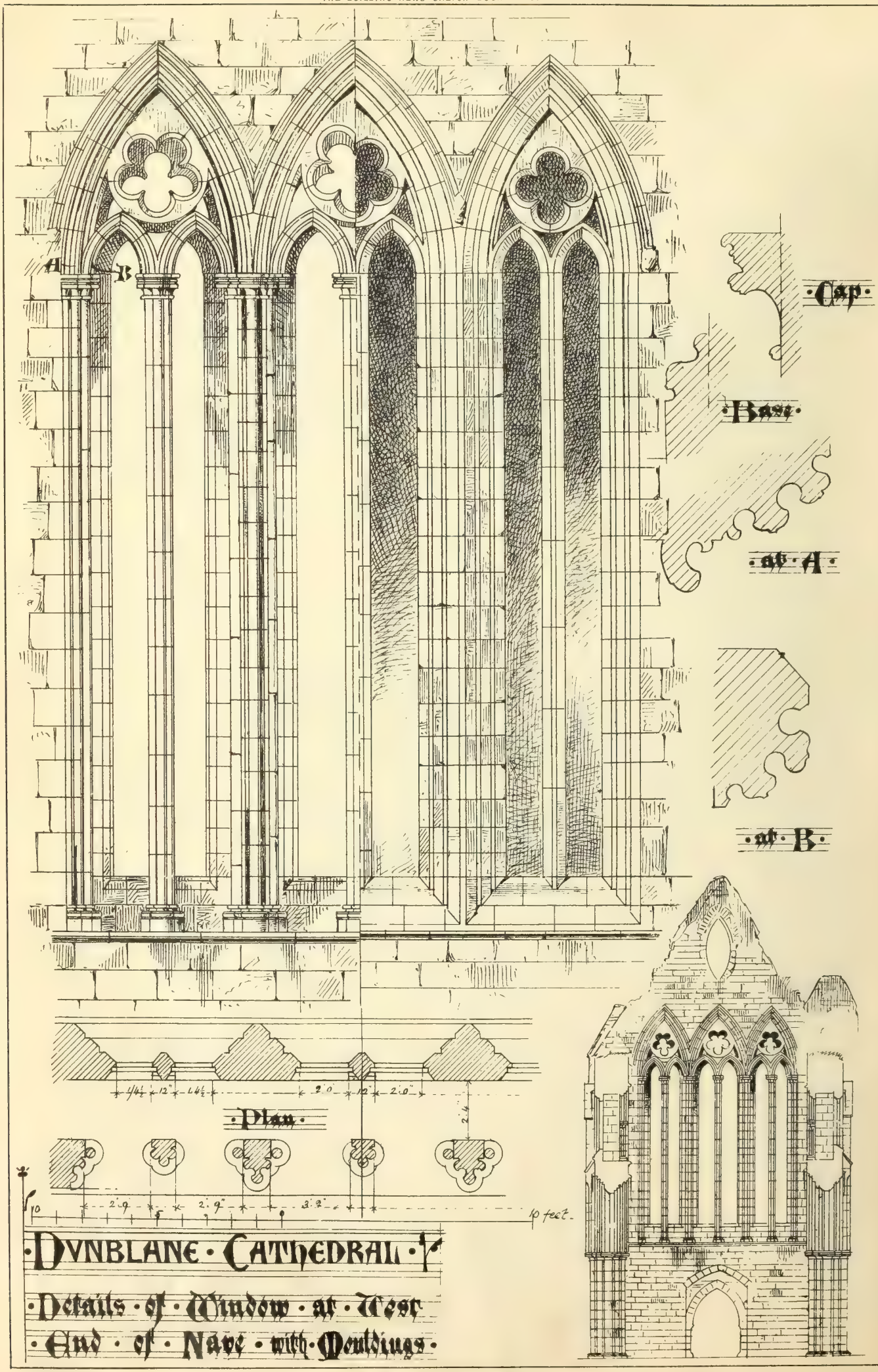
THE title which the drawing now illustrated bears on the original is "Hugh de Payen and Geoffry Adhémar found the order of the Knights Templars, under the patronage of Warmond, patriarch of Jerusalem, A.D. 1118." It is intended as a companion to one illustrated in The Building News in August last. In both a considerable portion of the upper gold background, as well as the lettered titles which form the base to the picture, have been omitted to suit the pages of The Building News, and of the two the present suffers most seriously by the curtailment. As these cartoons do not pretend to mimic pictures, but rather act as wall decorations in a situation where they have to struggle against conflicting lights, the chief aim has been to secure a semi-conventional balance of vigorous colour with an almost symmetrical style of grouping, and that at a comparatively small cost. The original coloured sketch is in the Architectural Exhibition, Conduit-street. J. M. S.

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Ancient Manufacture of Flint Instruments in Palestine. — The Abbé Richard communicated to a recent meeting of the Paris Academy of Sciences an account of the discovery of a workshop for the manufacture of flint instruments in Palestine. This workshop is near the village of El-Bire (the ancient Béeroth), about twelve kilometers from Jerusalem; the author found *haches*, scrapers, knives, and saws, the last said by him to be very remarkable.

International Exhibition of 1871.—Her Majesty the Queen has expressed her intention to give a prize of 1000 francs (£40) for the best fan, painted or sculptured, by a female artist under 25 years of age, and exhibited next year. The competition will be international.

The National Gallery.—The famous picture of John Bellini representing the Death of S. Peter Martyr, which excited so much admiration at the recent exhibition of Old Masters, has just been presented to the nation. This noble work of art is the munificent gift of Lady Eastlake. It may be remembered that on a former occasion she presented the National Gallery with a most valuable and interesting picture by Pisano of Verona. This continued generosity will serve to associate the name of Eastlake still more closely with the rise and progress of our fine national collection of pictures.



DUNBLANE CATHEDRAL

Details of Window at West End of Nave with Mouldings

Sketched by E F Clarke

Printed by Bradbury, Agnew & Co. Whitefriars, London

THE BUILDING NEWS, MAY 20th 1870.



BRIEF CHAPTERS ON BRITISH CARPENTRY.

By Thomas Morris.

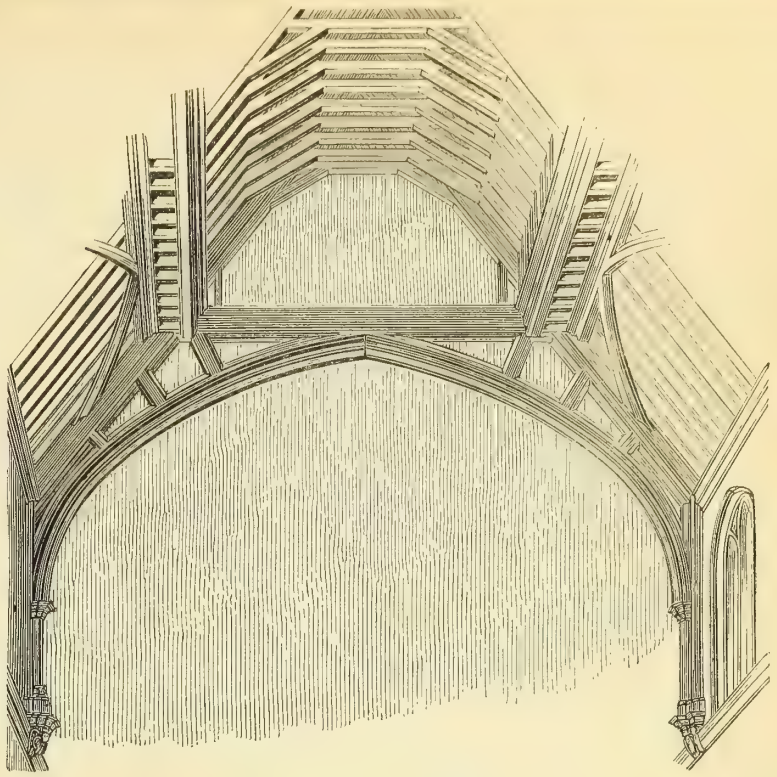
(*Continued from page* 346).

UNDER the present highly-improved condition of the country, with the ease of modern travelling and almost magical postal services, it is difficult to appreciate the reason of so many residences as some prelates maintained; but they were thus enabled to dispense an enlarged hospitality, to promote the personal correspondence of bishop and clergy, and keep up an efficient supervision. Croydon has been a place with some population from the earliest times, as shown by the *tumuli*, the circular encampment, and the Roman road in the vicinity. The memorable events are few, but in 1264 the Londoners who had sided with the barons were attacked here by the army of Henry III., and routed with great slaughter. In 1236, William, son of Earl Warren, was killed in a tournament. On May 25, 1551, a considerable earthquake was experienced; and the place was several times visited by the plague in the seventeenth century.

William I. gave the manor to Langfranc, but the patronage of the church remained in the Crown till 1351, when Archbishop Stratford became rector. A palace, though perhaps of moderate size and perishable materials, existed in the thirteenth century, but was probably of much earlier origin. Proximity to London must have made it convenient, but it never became a favourite abode like Charing or Mayfield. Still, it must have been a stately mansion, arranged about a quadrangular court, with the principal gate on the north and the hall on the south. There appears to have been a moat, and that method of fortification was rarely omitted where a supply of water could be had. The palace, with servants' apartments, stables, gardens, courtyards, and fish-ponds, contained nearly nine acres, and there was some appurtenant meadow. It was in such a house that the accomplished ecclesiastic and antiquary, Archbishop Parker, the first Protestant holder of the see, after narrowly escaping the flames in the previous reign, entertained Queen Elizabeth for a whole week in July, 1575.

Upon the melancholy end of Laud, the Parliament let the palace on lease to lay tenants; but it was recovered by the see at the Restoration, and inhabited till the death of Dr. Herring, in 1757, when it was deserted. Archbishop Cornwallis obtained an act in 1780 for alienating the property and building a new palace in some more eligible situation with the proceeds, augmented by other funds, inclusive of sums received for dilapidations, and from the Commissioners for building Westminster Bridge, by way of compensation for the prejudicial effect of that structure on the tolls of the Horseferry from Lambeth to Millbank. The building project was relinquished in favour of the purchase of Addington Park, near Croydon, authorised by an act in 1807, and that seat has since been the country residence of the archbishops. Croydon Palace, after the sale, was used for a manufactory, and the venerable edifice has been necessarily injured and disfigured; but the parts that remain have from the very circumstance of their jeopardy been invested with additional interest.

Dr. Ducarel considered the oldest parts of the palace, which are entirely of brick, to be of the time of Henry VI. The hall was in the clear of the walls, 56ft. long and 37ft. 9in. wide, divided into four bays, with as many windows on the south side. At the eastern bay of the north side is a vaulted porch some 15ft. square, which at one time had a room above with a chimney in one angle. The porch was the principal entrance, and opposite to it was a door into the gardens. Three arched doors in the east wall led to the buttery, kitchen, and cellar. All these doors



Hall Roof, Croydon Palace.

were shut off by a screen, with a gallery above, but no part of it remains. At the end, above the screen, was a lofty window, but this has also been removed. At a later period, there was in the place of the window a somewhat remarkable piece of sculpture, consisting of angels, royally draped, supporting a shield, and protected by a projecting canopy in the form of a bed-tester and valance. The arms are of England and France quarterly, impaled with those of Edward the Confessor. This ornament is considered of the same age as the hall, with the cornice of which the mouldings exactly coincide. The arms are attributed to Henry VI., and are presumed to have been put up by John Stafford, archbishop 1443-52, the assumed builder of the hall. This opinion is supported by the occurrence of his arms on shields in the moulded string-course that surrounds the hall at about 15ft. from the floor. His bearings are given singly—impaled with the see of Canterbury—impaled with Bath and Wells, his previous diocese. In this series of shields occur also the arms of Humphry, Earl of Stafford, created Duke of Buckingham in 1444, and other noblemen. Those of archbishops who followed Stafford were introduced from time to time. This string-course, ornamented with shields and the projecting corbels for the roof, formed an effective band, below which the wall was solid and unbroken except by the doors.

The design of the roof was grand and simple, laying open the full capacity of the interior, and imparting a character to the hall impressively noble. There are three perfect ribs, and half-principals are attached to the end walls. They have finely-curved four-centred arches, with a rise for the intrados of 13ft. 10in. These arches spring from the capitals of shafts, whose bases rest on the corbels already mentioned as connected with the string-course, similarly to those at Westminster. The constructive theory is well maintained; the arches are true moulded ribs, and they do not touch the principal rafters, but there are radiating struts from one to the other, dividing the spandrels into voussoir-like compartments. Crossing the roof at the crown of the arch is the usual level strut, in this instance wrought into fine mouldings, which, being mitred to those of the longitudinal purlins, form a kind of open panel in each bay. The purlins are not in contact with either the chief or common rafters, but give support to the latter by means of horizontal and upright spars. Higher up each pair of common rafters has a level strut and inclined supporters, as at Nursted Court. The rafters meet and are framed together at the top, without a ridge. The walls are finished with a bold cornice, and there are arched wind-braces on the slope of the roof in the lower part. Many features of the Early style are retained, and there was a louvre over the place of the central hearth till removed in the alterations made by Archbishop Herring.

Episcopal palaces constitute a valuable class of our domestic architecture: and in their variety may be seen the dissimilar characters of distant times. Croydon, for ages a home of the English primates, was advisedly abandoned; and in favour of unmarked portions it would be as idle to utter the shortest plea as to ask that scores of buildings whose appointed services are past should be perpetuated. But the hall of Croydon Palace has notable and sterling merits; it displays vigorous design, bold execution, and dignified effect. The roof is an example of British carpentry in its highest structural development, and few objects could more properly attract the conservators of national monuments than this stately and venerable apartment.

This roof, I should not omit to state, is reputed to be of chestnut wood, and from a comparison of the qualities of this timber with other most valued sorts, there is much cause to regret the gradual disappearance of so admirable a material. In any such view, however, it has to be recollected that for building purposes our native products have almost exclusively given way to importations; but in earlier times it must have been entitled to high esteem. It is the sweet, or Spanish chestnut (botanically *Fagus Castanea*), an Asiatic tree of ornamental growth, said to have been introduced into Europe by the Emperor Tiberius, and to have spread rapidly in the southern parts of the Continent, especially in volcanic districts; the largest representative of the species being the *Castagno de cento cavalli*, on Mount Etna. It thrives also in this country, and there are authenticated instances of its attaining a very large size. A forest of chestnut, according to Fitzstephen, who wrote in the twelfth century, once existed

on the north of London, and the wood appears to have been in very general use by early builders. In colour and appearance it resembles oak, but may be distinguished by the absence of transverse septa, or silver grain, that gives to oak its peculiar flower or figure when cut into boards. Chestnut grows more rapidly, has a smaller proportion of sap-wood, and is for some uses, of greater durability than oak. It also exceeds the latter in toughness, but is scarcely so strong, and in stiffness decidedly inferior.

ON THE PROGRESS OF ART, AND THE PROBABLE CAUSES OF THE GREEKS' PRE-EMINENCE IN ITS PRODUCTION.*

By H. C. Selous.

(Continued from page 364.)

IT is to the Egyptians and their art that I will first call your attention. That strange and mysterious people, with great magnificence in their ideas, but superstitious and timidly religious in their nature—a race whose antiquity seems to fade back even unto the beginning of all things—was a proud victorious power, with ample time and strong despotic rule, as their stupendous works now still existing show us. Thus, they had every opportunity of perfecting art if they had possessed a more exalted conception of in what true art consisted. A country of stone, a nation of stone-workers, with a great amount of skill and untiring patience, joined to some knowledge of mechanics, they, on the one hand, piled (like the fabled giants of old) mountains to the sky, and, on the other, executed such minute work on seals, rings, and other trinkets, that the aid of our modern magnifying glasses is required to decipher it. The Cyclopean ruins of their granite temples still remain upon the land from end to end and attest their indefatigable labour and unbounded patience. Yet, over this stony track of countless ages in vain do we look for one specimen of life-like art. We see around huge clumsy figures, scarcely ever varying from one monotonous position, grand only in their vast size. Their endless labyrinthine columned temples stand towering in gloomy majesty of departed beauty, but with monsters sculptured on their walls in forms repulsive—hawk-headed, dog-like, the brutal ape, and a host of others in aspect more hideous than the reptiles that the Nile brought forth. It was thus that the god-like human figure was deformed, debased, destroyed. The extraordinary people who perpetrated these monstrous atrocities in stone appeared to be to the ancient world what China a short time ago was to European countries of the present time—a land of mystery. Their laws, too, in many instances, appear to have borne a close resemblance. Like the Chinese, the Egyptians prohibited and threw every obstacle in the way of strangers entering into the country, and their surplus population was deterred from emigration under severe penalties. A country destitute of forest trees, Egypt remained for centuries without a navy; the people had neither the means nor the wish to have communication with other countries. We, in the present day, are too apt to be led away and repeat the erroneous impressions and exaggerations that so unavoidably influenced the ancient historians in their accounts of that early people. Hence we are inclined to imagine that we are indebted to the Egyptians for much that is important for the advancement of the civilisation of mankind. But I think upon inquiry such will not be found to be the case. As an instance, it was very generally and naturally supposed, in looking at their prodigious temples, their colossal statues and massive pyramids, that a people who could erect such wonders must have had a thorough knowledge of mechanics, and it was stated by ancient writers that such was the fact; and many authors of our own day have taken vast pains to describe the complicated contrivances that the Egyptians were supposed to have used in the transportation of their material and in the erection of such vast buildings; but upon the perfect walls of their rock-hewn tombs there has been discovered an exact representation of the means employed by them in moving enormous masses of stone. Precisely the same subject, curiously enough, is delineated on the walls of the Assyrian palaces. Multitudes of human beings combining their animal force, and the lash of their despotic taskmasters, appear to have been the principal powers employed. Knowledge and power the Egyptians undoubtedly possessed, but they were those of a primitive race, destined, like the ancient Mexicans, Peruvians, and, eventually, the Chinese, to pass away without contributing much to the advancement or knowledge of art to the human race. When forced by the progress of surrounding nations into communication it caused their ruin. They were incapable of improving; their weakness was discovered, and they passed quickly away, leaving no impress either of their knowledge or power upon posterity. How different has been the legacy of the refined and vigorous Greek intellect upon the world! Even to the present day we feel its influence, and that influence will still continue and pass on undying unto the climax of civilisation. One of the most talented writers of our day, Draper, in his "Intellectual Development of Europe," shows that the rise, progress, and decay of nations may be likened to the corresponding changes that take place in the vitality of an individual. I will pursue the simile still further, and endeavour to show that it is not only in the history of a nation, but in the history of the world, that the same stages are taking place, in the same order that we recognise them in animal life. The Egyptians, the first civilised inhabitants of Africa, and probably of the world, together with the Babylonians, Assyrians, and other countries of Asia, may be considered as typical of the earlier stages of individual life. They were the strong children of the earth when the earth itself had been but lately formed as fitting for their cradle. Each phase of the world's life appears to have produced and carried to great perfection one of the fine arts of civilisation, and singularly enough, the arts that *all* these earlier nations most excelled in was architecture, as there is every reason for believing that the Babylonians and Assyrians were as great in their ideas and as stupendous in their building propensities as the Egyptians themselves. The latter nation alone, on account of the greater durability of the material employed, has left to us the rudiments and principles of the first or infant art of civilised life carried out in giant proportions. It is interesting to remark that the Chinese, true to the instinct of a primitive race, when they pass away will leave behind them a monument of former greatness surpassing in magnitude anything that has yet been produced on earth. I allude to the Great Wall of China, which stretches in one unbroken line for more than a thousand miles. The Egyptians, then a type of all the early nations, may be looked upon as the children of the ancient world when the world itself was in the infancy of its progression. Born, then, the child, she remained the child up to the end of her career—a clever child, no doubt, but incapable of advancing, as it were, beyond the rudiments of art or improving upon her child-like efforts; for it cannot fail to excite our wonder that a nation holding an uninterrupted career upon a portion of the earth for thousands of years, and thousands more even than we imagine, should make no progress. The Egyptians, in erecting such stupendous and indestructible monuments to perpetuate the name and power of a nation they imagined would never pass away from the face of the earth, found it answer a second and important purpose—that of getting rid of their immensely super-abundant population by destroying tens of thousands yearly in the building of those vast temples and gigantic monuments, whose ruins now existing still excite our amazement and baffle our endeavours to discover for what purpose they were erected. The hard tasking of the Israelites and the edict to destroy all the male children of their race, are proofs, amongst others, that the surplus population of the Egyptians must have been a source or serious consideration and trouble. Nevertheless, in contemplating the past history of this great nation of antiquity, we are impressed with a feeling of a certain amount of gloomy and terrific grandeur, magnified through the mist of past ages, and we are lost in wonder at the mighty and stern power that caused the creation by the tiny hand of man of such stupendous works. But the soul of art is wanting in these stony giants, hideous forms, and creeping reptiles. We turn from them dissatisfied; we feel that their power is gone, either to awe, to please, or to instruct. Few of refined mind would care to look upon them a second time. It is clear, then, that here we cannot find the elements of beauty or of true art, nor from this polluted spring can Greece have drawn its first draughts of inspiration.

In the order of time those who next appear upon the stage and influence the history of the world are the powerful nations of Asia—Babylonia, Assyria, and others. These strong and athletic races, imbued with a taste for gorgeous attire, a passion for the chase, and a corresponding thirst for war, assisted greatly by the vigorous enterprises in mercantile pursuits and the maritime discoveries made by the Dardanians and Phœnicians (the only nations in the world that then possessed a navy), at length forced their way into Europe, and their importance in the world's history culminated in the assistance that they gave to the prowess and civilisation of that wonderful and extraordinary people, the Hellenic race, the first who emerged from barbarism in this quarter of the globe. These Hellenic or Greek people, with their vivid imaginations never at rest, their thirst for pleasure, their redundancy of vigour in all their conceptions, their keen sensibility and appreciation of the beautiful, their love of enterprise, their carelessness, caprice, and faults innumerable, forcibly impress upon us the idea that they fitly represent that state in the history of the world that corresponds with what is termed in the career of man the vigour of youth. They improved and refined on all the luxuries and elegancies of social life, and disseminated their knowledge over almost every portion of the then-known and habitable world; and they invented and carried to perfection in the highest degree that grand and noble art that ranks as the second great acquirement in the progress of the human intellect—the art of sculpture. This stage of the world's life may be considered to have terminated in the convulsions that destroyed the existence of the Roman Empire and the Pagan world. Through the dark crimson clouds of blood, misery, and death which accompanied the destruction of that mighty power, the world passed into the third stage of its life's history—our present era. Punished for its crimes, and chastened for the errors of its youth, it moved by slow and painful steps into the full power of intellectual manhood. With a purer religion and more exalted ideas, the mind of man was now in a fit state to understand and carry to perfection the last and greatest of the arts, the most refined and pleasure-giving emanations that have ever issued from the immortal mind of man—painting and music. These ennobling and fascinating twin-sister arts have hand in hand advanced together, growing in strength and beauty, and ministering to and exalting our pleasures; they soothe the over-heated or exhausted brain, and assist it in its allotted task of work eternal. Thus, then, it would appear that in progressive stages of the world's history we have attained and carried to perfection in progressive order all the great and important arts that can be known. You will observe that I have omitted poetry from the catalogue of the art-acquirements of mankind. I have done so because poetry is not an acquired art or an emanation from man's brain; it must be and is born with us. It is part of our nature, and is shown in its most perfect form in the earliest stages of the world's history equally as in its highest state of civilisation. The sublime poetry of the oldest book in the world, and the vigorous verses of blind old Homer, are equalled in the ideas of a Goethe, a Milton, and a Shakespeare, and there is no reason why there should not be born a poet as great, if not greater, than any that have yet appeared. There is no limit to the mind or the ideas of man. But it is not so with the arts that he acquires by the aid of manual dexterity. When once carried to perfection man's work is at an end; he cannot go beyond. The world will never see again such sculptors as the Greek school produced, such painters as sprang from the studios of the Italy of the fifteenth and sixteenth centuries, and I fear me, such mighty masters of music as Bach, Handel, Haydn, Mozart, Beethoven, or Mendelssohn are destined never to be surpassed. Yet there is nothing to regret in all this. The progress in other directions in our own time is so astonishing and of such importance to the whole human race that we cannot but feel we are now passing into the fourth stage of man's intellectual powers and the world's existence—that of maturity of mind and the astounding realms of science—and that we are destined to accomplish mighty changes in the world's history; and though the future may be hidden from our sight, we may rest assured that the progress of events will constantly tend towards the advancement of our civilisation, and the increase of our happiness.

* Read before the Society for the Encouragement of the Fine Arts, on Thursday, May 5.

I will now turn back for a short period to give a brief sketch of another great nation of antiquity, whose rule was mighty, and who, like the Egyptians, have also left vast monuments to attest their skill in architecture and sculpture, and who, during their long conquering reign on earth, had ample time to have perfected art (if time alone were wanting). I speak now of the Assyrians—a more luxurious and powerful people than the Egyptians, more inventive in art, more proportionate in architecture, more elegant in dress, and in their ornaments occasionally almost vieing with the Greeks themselves in beauty. A warlike and athletic people, they were devoted to the pursuits of war and the pleasures of the chase, and no doubt they were the first subjugators of that beautiful and serviceable animal the horse—a most important step in the civilisation of man. On some of their sculptured slabs they are shown hunting and capturing the animal, which in its wild state must have wandered over portions of the extensive plains of Asia, its native birthplace. From thence it was introduced into Egypt, as the inhabitants of that country were unacquainted with the animal in the earlier portion of their career. The Assyrians, and other Asiatic tribes, were also the first to make use of the chariot in war. The constant pursuit of hardy and athletic exercises on the part of the people of this nation produced a corresponding muscularly-developed people, and, in consequence, having better models before their eyes, they had a greater knowledge of the human figure than the effeminate Egyptians, and therefore in their sculptured works ventured more into the complicated realms of action, and displayed a certain amount of anatomical knowledge of the human figure. They having the advantage, too, of a softer material to work in than the Egyptians had to contend with, we see, as must be expected, a much greater attention paid to minute finish and delicate detail. Indeed, their manipulation was so excellent, and their material so easily worked and so readily procured from the neighbouring mountains, that it will be clearly perceived that they had every facility given to them for arriving at the greatest perfection in the art of sculpture. But the power was denied to them—and from the same causes that produced the failure of other nations—they also failed to perceive the natural dignity, grace, and beauty of man's perfect form. They treated it with contempt, and delighted in degrading the human figure, transforming it into monster shapes, with heads and breasts of inferior animals, to depict their deities; and in the representations of the exploits of their warlike monarchs the mutilation of the human figure was depicted with a savage pleasure that showed their total want of feeling or appreciation of its beauty, and a want of perception of the dignity of art and of subjects proper to its productions. Huntings, battles, sieges, slaughterings, and other horrors—these are the favourite subjects in those great pieces of sculptured alabaster which have been handed down to us from the walls of their colossal ruined palaces. But the dawn of intellectual art was fast approaching, and Europe was now destined to be its birthplace, and its glorious task to carry that art to the highest degree of perfection, and so achieve what the thousands and thousands of years of the civilisation of Africa and Asia had failed to accomplish. The time had now come when the world should be enlightened as regards the real dignity and power of art to refine the mind, to exalt the intellect of man, and to teach him to have respect for the graceful and grand form that the Great Creator of the Universe had made to be a habitation and a fitting instrument to execute the commands of that wondrous and incomprehensible power, the human mind—a form that in itself contains the elements of every beauty, the perfection of every mechanical contrivance—and the people that were destined to hand down to us inestimable works and art laws that are eternal have already begun their labours. In one of the most beautiful and habitable parts of this our earth—I speak now of what Greece was, not what it is—one of those rare and favoured spots blessed with a sunny, ever-genial climate, the balmy air heavy with the scent of many flowers, and gentle vibrates of the bees' soft music, with hills of the purest marble fringed with the myrtle and the olive, enriched with deep, shady, venerable groves, partially illuminated and diversified with sunlit emerald glades, the broad rich meadows spotted with lowing herds and tinkling flocks, the land refreshed by ever-murmuring rills and prattling streams, cool and pure as the marble rocks that brought them forth, rushing with sparkling joy to leap into the deep azure lake-like sea, jewelled with glittering islands, reposing in bright clusters upon her dimpled bosom—here, with all around to lead the mind of man to thoughts of peace, happiness, and love, Nature's sweet breath first poured into his soul an infinite love for art and a power of discovering and appreciating all that is graceful, beautiful, and true.

(To be continued.)

THE NEW HALL, INNER TEMPLE.

THE Princess Louise opened the new hall of the Inner Temple on Saturday last. The new hall is of Gothic design, and is from the designs of Mr. Smirke. Internally it is 93ft. long by 41ft. wide, lighted by lofty windows on each side, by a single great window at the west-end, and by an oriel window at the south-east angle. The roof is of Gothic design, in dark oak, and is supported by six arches resting on corbels, decorated by carved angels supporting shields, on which are painted the Royal Arms of England as they have varied from the time of Queen Elizabeth until the present day. The arches themselves are decorated by carved pendants, relieved by occasional gilding. The windows on each side of the hall are transomed, each having three lights in two tiers, and all destined to be filled with designs in stained glass. The three lights of the upper tier in each window are to be reserved for the figures of eminent personages connected with the history of the Temple, a king or queen always occupying the central light. The lower tiers will be devoted to representations of events in which the personages in the tiers above have taken part. Only one of these windows, the most easterly on the southern side, is as yet completed. On the upper tier the central light is occupied by Henry I., the western light by Heraclius, Patriarch of Jerusalem, the eastern light by William Mareschall, Earl of Pembroke. In the centre light below is depicted the drowning of the King's children in the ill-fated White Ship, in the western light the building of the Temple Church, and in the eastern light Templars in action with Saracens. The oriel window is filled with coats of arms on quarried fields and coloured borderings. It contains 22 shields, of dates ranging from 1466 to 1818, commencing with the arms of Thomas Littleton, and concluding with those of Lord Tenterden. Among other historic names here commemorated are Sir Christopher Hatton, Sir Edward Coke, and Lord Thurlow. It is intended to fill the great west window with two subjects from English history relating to the institution of laws; but these subjects, and those for the remaining side windows, have not yet been fully decided upon. Beneath the windows is a white stone stringcourse, ornamented with gilded pateras; and below the stringcourse a double row of shields, bearing the arms of all the successive readers of the Inn. Below these shields there is an oak panelling of very effective design, the panels being separated by light oak buttresses, surmounted by carved pinnacles. At the eastern end the upper part of the spaces above the panelling is occupied by an allegorical painting by Sir Jas. Thornhill, representing Pegasus striking with his hoof the mountain of Helicon, from which Hippocrene, the stream of the Muses, issued in response to his blow. Queen Elizabeth granted to the Inn a coat of arms, in which Pegasus is the charger, and the picture was designed to illustrate the heraldry. Below it are ten full-length portraits, arranged in two rows of five, and containing five crowned heads and five lawyers. The screen at the west end of the hall is formed by a continuation of the oak arches of the panelling, the panels themselves being replaced by glass ground in a pattern, with conventional roses and triplet leaves. The hall is lighted by six sunlights in the roof, and by sixteen crown burners projecting from the walls. Two of the outer entrances are adorned by carved oak doors of venerable antiquity, one of them dated 1575, and both preserved from the former hall. They are decorated by allegorical male and female figures carrying serpents, and by borders with lutes, weapons, flowers, and fruit.

PARLIAMENTARY NOTES.

THE DISMISSAL OF MR. BARRY.—On Friday last, Mr. Cowper Temple drew the notice of the House to the correspondence relating to the dismissal of Mr. Edward Barry from his employment as architect of the House of Commons, and moved that in the opinion of the House the abrupt discontinuance of the employment of the architect who has hitherto been engaged whenever professional skill and responsibility were required, at a moment when works entrusted to his direction were still in progress, is uncalled for and of doubtful expediency.—After some conversation, Mr. Ayrton opposed the proposition, and defended his own conduct at some length. It was, he maintained, the first and most important duty of the Commissioner of Works to see that the public money was properly expended, which duty he had endeavoured to perform to the best of his ability. He denied the accuracy of Mr. Temple's statements. What he had done was in conformity with the decision of the Government, which had also been carried out in the case of the new Foreign Office, and the object of which was that there should be a Minister strictly responsible to Parliament for all the expenditure on public works, and those entrusted with the technical and practical execution of those works should be under the authority and responsible to the Commissioner. It was only in this way that they could ensure responsibility and the economical administration of the money voted by Parliament, which was impossible if it was to be expended by independent professional men outside the department, and who repudiated all responsibility to its head, who was by law made responsible, and expected by Parliament to be so. Mr. Barry, with whom there had been originally no intention to interfere, raised all kinds of obstacles to the reforms and changes in the department which he was carrying out in accordance with the decision of the Government. He had declined to discuss these questions with Mr. Barry, who insisted on professional "rights and privileges" quite inconsistent with his original appointment. He had been obliged to demand from Mr. Barry the technical plans of the building; but he insisted upon his right to retain them, and the executors of Sir Chas. Barry also put in a claim for them; while Mr. Barry also contended that he ought to be paid for the plans delivered; but he (Mr. Ayrton) did not think he was justified in expending the public money for what had already been paid for, and the question would have to be settled in a court of law. He denied that he was bound to accept the decisions of a professional combination like the Institute of Architects, who arrogated to themselves the sole right of designing and building public edifices.—After some discussion, participated in by Mr. Beresford Hope, Mr. Bernal Osborne, and others, the House divided, and the motion was negatived by 152 to 109 votes.

OUR STATUES.—Lord Claud J. Hamilton, on Tuesday, asked the First Commissioner of Works whether his attention had been called to the fact that the bases of the statues in Waterloo-place, Cockspur-street, and Charing-cross have been used by the road contractors during the past 14 months as depots for stones and other rubbish, and whether he had any authority or power to direct a discontinuance of the practice.—Mr. Ayrton's attention had not been called to the matter until he had received a communication on the subject from the noble lord himself. In point of fact, he had no authority to interfere in this matter, as it more particularly belonged to the Home Department, over which his right hon. friend in his neighbourhood presided. As, however, the noble lord had been good enough to write to him upon the matter, he had directed that communications should be addressed to the vestries by whom the several roads were managed. The surveyor of S. Martin's parish stated that in future he would have the rubbish removed immediately, and that there should be no similar accumulation near the statues. The surveyor of S. James's, Westminster, had written to say that he could not give the assurance requested of him, because he did not consider that he had the authority to do so. He would, however, bring the matter before the vestry, who would, no doubt, do what was required.—Lord Elcho: Perhaps some of the statues may be removed with the rest of the rubbish.—Mr. Ayrton: That is a question of art, a subject upon which people always differ. I must therefore be excused from replying to the noble lord's question.

KENSINGTON-GARDENS.—Sir H. Hoare, on Tuesday, asked the First Commissioners of Works whether he was prepared to place in the hands of members the plans of the proposed improvements

and alterations in Kensington-gardens, previous to the carrying out of the same.—Mr. Ayrton said since notice was given of the question he had introduced a Bill which would be necessary to complete the improvements in question, and the plan would have to be submitted to the consideration of the Select Committee which, as a matter of course, would be appointed. When the committee should have reported he would take care that the plan they should have finally approved would be appended to the report.—Lord Elcho inquired whether, as part of the plan involved the cutting down of certain trees, that would be deferred until the report was presented.—Mr. Ayrton replied that nothing would be done to the trees at present. This was not exactly the time for cutting trees.

ARCHITECTURAL AND ARCHÆOLOGICAL SOCIETIES.

DURHAM AND NORTHUMBERLAND ARCHÆOLOGICAL SOCIETY.—On Friday last, the first general meeting of the Architecturaland Archæological Society of Durham and Northumberland was held at Boldon and Hylton Castle, and was attended by about twenty members, including the president (the Rev. Canon Greenwell). The meeting place was Brockley Whins Station, whence the party walked to West Boldon, and proceeded to inspect the ancient church, whose chief attraction is its rare Early English tower and spire, rendered more striking by the picturesque site chosen by the ancient builder of the edifice. One of the bells in the tower is dated 1536, and the parish register goes back as far as 1500. The Rev. C. F. Hodgson gave a description of the church. The party proceeded on foot to Hylton Castle. After a minute inspection of the very fine exterior, a paper was read by Mr. Longstaffe, who traced the history of the estate from the earliest time down to its purchase by the present owner, entered into a minute description of the building, and concluded with a reference to the "Cauld Lad o' Hylton" and other legends connected with the place. The party next left the castle and proceeded to Monkwearmouth to visit the ancient parish church.

EDINBURGH ARCHITECTURAL ASSOCIATION.—The usual fortnightly meeting of this association was held on Wednesday last, Mr. Ross in the chair. Several new members were admitted. Mr. John Webster read a paper on "Building Materials." He confined his remarks to the various timbers used in building, explained their several qualities, pointed out the cause of their defects in warping and twisting, and gave a few suggestions as to how these may be best avoided. Some discussion followed the reading of the paper, and after passing a vote of thanks to Mr. Webster, the meeting separated.

Building Intelligence.

CHURCHES AND CHAPELS.

CRANSLEY.—The parish church of Cransley, Northampton, was re-opened after restoration on the 5th inst. The church, which is dedicated to S. Andrew, is in the Transitional style, partly Early Perpendicular, partly Tudor. The old high wainscot around the chancel has been removed, disclosing to view some beautiful sedilia, a piscina, a vacant tomb, and other recesses. The roof, as also that of the whole of the church, has been taken off, but so much of the material (oak) as was sufficiently sound has been replaced, the new work required being of oak of English growth, and in strict accordance with the old work. A very noticeable feature of the restoration is the opening of the tower arch. The nave and aisles have been entirely re-paved, Ketton stone being used where fresh material was required. Externally, the modern defective parapets on the chancel, nave, and north aisle have been removed and replaced by others of Ketton stone, similar to the best of the original ones. The whole work has been carried out from the designs, and under the superintendence of Messrs. Slater and Carpenter, of 4, Carlton Chambers, Regent-street, London. The builders engaged on it were Messrs. John and George Henson, of Kettering. The cost of the work is £2000.

DERBY.—A new Congregational Chapel, Derwent-street, Derby, has been opened. The chapel is planned to seat 350 persons, and is of sufficient height to admit of the addition of side galleries, for the insertion of which, and the extension of the end gallery, provision is made. By their means the accommodation may be increased to 500. An organ gallery occupies a recess behind the pulpit, and beneath is a vestry. The site provides ample room for commodious schools, which it is proposed to erect at a future time. The style of architecture is Gothic of the fourteenth century. The work has been executed by Mr. Stoddard, of Derby, the contract price being £1258. The architect is Mr. Tait, of Leicester.

DUNDEE.—Recently a movement was commenced with the view of getting the Old Steeple repaired and renovated, and last week a numerous meeting of gentlemen, who had been requested by the Town Council to aid in the matter, was held in the Town Hall, Dundee. The Town-Clerk read letters which he had received from the Earl of Airlie, the Earl of Strathmore, the Earl of Southesk, Lord Wharncliffe, Lord Kinnaird, Sir John Ogilvy, M.P., Mr. Armitstead, M.P., and others, expressing their readiness to assist in defraying the expense of the work of restoration. Resolutions approving of the efforts now being made for the purpose of repairing and restoring the steeple in accordance with its original style of architecture, and agreeing to take the advice of Mr. Robert Mathieson, assistant surveyor of Woods and Forests, as to what is necessary to be done, were unanimously agreed to. The Old Steeple, which is supposed to have been erected during the fourteenth century, is declared by Billings, in his "Ecclesiastical Antiquities," to be "the largest specimen of a church tower in Scotland, raising its gigantic form to a height of nearly 160ft.; to be the most elaborately ornamented, and certainly the most picturesque."

HORNINGTOFT.—The church of S. Edmund, Horningtoft, Norfolk, was re-opened a few days ago, after a thorough restoration. It was previously in a very bad condition, and the usual services were unable to be held on account of the dangerous state of the nave roof, which threatened to fall in at any moment. A new roof has been substituted for the old one, the south wall of the church rebuilt (all the old work of Early English date being carefully preserved), open seats placed in the nave and chancel, and the original rood screen restored and re-decorated. The cost of the restoration has been about £400, towards which the Incorporated Church Building and the Norwich Diocesan Societies have made grants. The work has been satisfactorily carried out by Mr. G. Brown, a builder in the neighbouring parish of Whissonsett; Charles J. Moxon, A.R.I.B.A., of London, being the architect.

LEEK WOOTTON.—The Rev. M. E. Browne says there is an instance of an Eleventh Commandment being found on the wall of a chancel at Leek Wootton Church, near Warwick. The chancel was built about twenty-five years ago, and the commandment newly painted about the same time. It need hardly be stated that the so-called commandment is the "New Commandment of the Gospel."

OLDHAM.—S. Peter's Branch School church, Oldham, was opened for divine service on Sunday week. The building is in the Gothic style, with open timbered roof, and two-light windows with pointed heads, and has a spirelet, containing a bell, upon the apex of the gable. There is a porch to the principal entrance and a small chancel with vestry attached. The building will seat about 250 persons. The total cost will be about £800. Mr. John Wild, of Oldham, is the architect, and Mr. William Lees, of Greenacres-hill, the contractor.

BUILDINGS.

BRADFORD.—The plans furnished by Messrs. Taylor and Garthwaite, architects, Bradford, have been selected in a competition for the proposed new works of the Bradford Abattoir Company, at Bolton Bridge, near Bradford. The plan, although plain and simple in detail, is comprehensive in character. The exterior will be constructed of stone, and the interior walls finished with hard, calcined, pressed bricks, walled closely together. The estimated cost for the whole of the buildings is £5300, of which £3100 is for the abattoir, £900 for hanging sheds, £1150 for the hotel, and £150 for the stabling and shed.

MANCHESTER.—A new goods station for the Midland Railway was opened in Ancoats last week. It makes no pretensions to architectural beauty, but is fitted with every modern appliance for the conduct of a heavy traffic. There is a long shed, 300ft. by 328ft., with arrival and departure platforms, each 30ft. wide (each fitted with twelve of Sir William Armstrong's hydraulic cranes), for the accommodation of the general traffic. A central platform, 15ft. wide, and fitted with four hydraulic cranes, is provided for vegetable and "perishable" traffic. The whole area covered by the shed is cellared, the cellars being reached by flights of steps and trap-doors. Above a part of the station is a large room 300ft. by 200ft., which is to be used for warehousing goods. This is likewise fitted with hydraulic cranes. There are numerous offices attached. The works have been carried out under the superintendence of Mr. J. S. Crossley, of Derby, the company's engineer, the architect being Mr. J. W. Sanders, of Derby, and the building contractor Mr. E. Johnson, of Manchester.

SALFORD.—The Corporation of Salford are about to have three new police stations erected in the outlying districts of their borough. The plans for all the three stations were prepared by Messrs. Royle and Bennett, architects, Princess-street.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

RECEIVED.—C. J. M.—T. N. L.—R. G. and Co.—J. M. T. S.—R. G. and Co.—J. N.—H. J. E. B.—R. G. H.—Col. S. B. W. T.—W. T.—J. H. and Co.—J. P. S.—C. B. A.—W. S.—R. W. and Son—G. and Co.—J. M.—C. H.—M. and W.—J. W. W.—S. and S.

Correspondence.

DR. ZERFFI'S "NEW STYLE."

(To the Editor of THE BUILDING NEWS.)

SIR,—As a last answer to the anonymous attacks in your paper, I beg to state :—

1. That it is not my custom to misquote. In Dr. W. Smith's Dictionary of Greek and Roman Antiquities, you will find this passage, page 171 : "Atticurges, Ἀττικουργές, *in the Attic Style*, is an architectural term, which occurs in Vitruvius III. 5, sec. 2 ; IV. 6, secs. 1 and 6." Meineke says that the word as a common adjective occurs only in a fragment of Menander, No. 628. "The word is evidently used to describe those variations which the genius of the Athenian architects made upon the established Doric and Ionic orders." These variations I described in general in my letters to THE BUILDING NEWS, April 22, 1870, and these variations are called the *Attic Style*.

2. To speak of anything Greek at the same time as Attic is contrary to all knowledge of Greek history. We know very well that Greece was a general term, but Attica was only given to that tract of land which was situated between the Strait of Euripus or Negropont on the north-east, and the Gulf of Saron or Ægina on the south-west. The province formed a triangle, with the frontiers of Bœotia for its basis, had Athens for its capital, and extended over an area of 750 square miles. There was not only an Attic style of architecture, but an Attic style of philosophy, speaking, dancing, dressing, and even eating, drinking, and cooking ; exactly as we talk in our days of a Parisian style of dressing, cooking, and living.

3. As to my statement concerning the height of houses in ancient Rome, I beg to refer my anonymous assailant to a well-known work by Dr. T. H. Dyer, on "Pompeii," *written in English*, where, page 251, the following passage is to be found :—"At last houses (in Rome) reached such an extreme height that Augustus forbade a greater elevation than 70 feet given to them." My assailant, apparently, does not know the difference between the lodging or dwelling houses of the Roman plebeians, and the villas, mansions, and palaces of the Roman patricians. I have to teach history, and only *qui bene distinguit, docet bene*. Augustus could not have given a law against building houses too high if such was not the case ; my supposition is therefore perfectly correct, and certainly not the outburst "of a fertile imagination of an audacious doctor," as my anonymous assailant asserts with great courtesy. If any historian were to describe S. Giles's as a heap of narrow, unwholesome by-lanes, he could not be answered—"But S. James's is a palace,"

for this assertion would not turn dingy houses into palaces.

4. The boast of my anonymous assailant "that he knows the buildings of Attica as his fingers," in juxtaposition to his humble confession that he knows nothing of Dr. Lübke's "History of Art," *translated into English*, after the 4th German edition, by F. E. Bunnett, and published, London, 1868, by Smith, Elder, and Co., (in which standard work he could find many new ideas on ancient Classical art) is really *tragi-comical*.

In concluding, I hope only that my assailant will drop the veil of his anonymity, and refer me to his classical works, that I may, in studying them, increase my knowledge, and get rid of my *audacious ignorance*.—I am, Sir, &c.,

G. G. ZERFFI.

WOLLATON HALL.

SIR,—I have seen in your valuable journal that Wollaton Hall, including many others about the same date, was designed by a John Thorpe, but a tablet in Wollaton Church is inscribed as follows:—

"Here lyeth ye body of Mr. Robert Smythson, Gent. Architetor and Svrvayor vnto the most worthy hovse at Wollaton with diverse others of great accovnt, he lived in ye fayth of Christ 79 years, and then departed this life ye xvh of October, Ano. Dmi. 1614."

The original drawings are signed by Mr. Robert Smythson, and were kept at the hall in the Record-room; the elevations have been removed to the offices on the estate, and have been tinted, and a splendid example of drawings they are. A tablet on the hall shows the building to have been commenced in 1580, and finishe d 1588, and a more perfect example of stonework cannot be found in the Midland Counties; it is built of Ancaster stone.—I am, Sir, &c.,

Ilkeston, near Nottingham. WILLIAM WARNER.

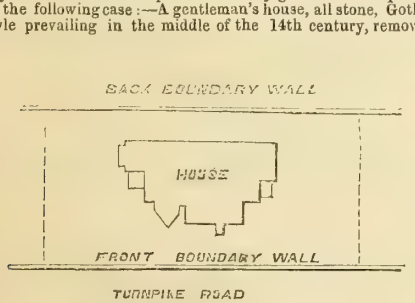
Intercommunication.

QUESTIONS.

[1850.]—DEAD BLACK FOR BRICKS.—I should feel obliged to any of your readers who would inform me through THE BUILDING NEWS of a process by which red bricks in work can be dyed black to resist the weather; it must be a dead black.—C. W. B.

[1851.]—PROFESSIONAL PRACTICE—I should be greatly obliged if you or any of your readers would kindly reply in your useful paper to the following, in reference to professional practice:—What is the usual percentage of fees for an architect to charge for the preparation of a set of designs, working drawings, specifications, and details, for a row of first class houses on a piece of building ground owned by a builder who may carry out the works from these drawings which he has ordered without the architect's superintendence, or may allow those who take sites to employ their own builder, and merely restricting them to the elevations and materials designed by the architect? Will such remuneration entitle him to require the return of the drawings when the houses are completed, or do they become the property of the builder? If so, should not a larger percentage be charged, and on what scale? The houses are symmetrical, but of two designs, both in plan and elevation.—A BEGINNER.

[1852.]—BACK BOUNDARY WALL.—Would you or any of your numerous correspondents kindly give me their opinion in the following case:—A gentleman's house, all stone, Gothic style prevailing in the middle of the 14th century, removed



from the turnpike road about 30 yards. Would a back boundary wall, built of stone, and lined with brick inside (and can be seen from the turnpike road), be in keeping with style of house, as per sketch?—SUBSCRIBER.

[1853.]—VIBRATION OF BELLS.—Perhaps some of your numerous readers who have had experience in such subjects would give their opinion whether they consider there would be any risk to a 14in. brick arch turned in cement, over a peal of eight bells, which are to be swung in a tower 13ft. square. The walls are 3ft. 9in. thick, of stone, built entirely in cement, a tie bar being inserted in the walls all round at the level of the arch; the latter is 12ft. above the larger bells, and 6ft. above the smaller ones. It has been stated that the vibration of the walls will, when the bells are swung, cause the arch to crack and fall to pieces.—A CONSTANT SUBSCRIBER.

[1854.]—SIZE OF OVERFLOW PIPE.—I want to know safe size for an overflow pipe to a 350 gallon tank supplied by about 1500 feet super of slate roof, and should be obliged if some correspondent will show a ready way of calculating the amount of storm water off such a roof, with the necessary size of overflow?—H.

[1855.]—WATERCLOSETS.—Among the many patents for the above it is difficult for one who is not acquainted with the mechanism to know which is best. Will some correspondent inform me a little as to which are the simplest and best of the different kinds of pan and valve closets, also if the patent regulator is any advantage?—H.

[1856.]—TRUE CONSTRUCTION.—Is it not inconsistent with the principles of "Gothic architecture" to place shamprincipals against the interior gables of say a church, since the *walls* are actually the supporters of the purlins, &c.—TRUTH.

[1857.]—BOWLING GREEN.—Would some of your professional readers favour me with their experience in the formation of a bowling green 30 by 40 yards. The points I wish information on are—viz., surface excavation, how deep? bottoming of what kind, and how thick? drains, how many, how formed, and of what kind of tile? also as regards turf, ornamentation, and cost?—ASSIST. C.E.

[1858.]—FAILURE IN PORTLAND CEMENT.—I am at present building a Fives Court roofed with glass, the walls are brick, 14in. thick. The side walls have been cemented 9ft. high, and the end walls the whole height. The cement was wrought and finished smooth on the surface in the same manner as three coat plaster, but it has all failed, the second coat has in many places parted from the first coat, and come off in slabs. Could any reader, through Intercommunication, tell the cause of failure, and say if it is possible to have walls finished smooth in Portland cement, and if so by what method?—D. H., Scotland.

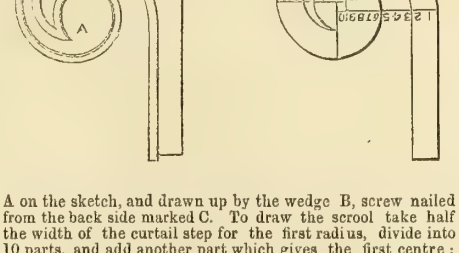
[1859.]—EQUATION.—Will any of your readers kindly inform me how the equation $D = \frac{V^2}{70A}$ in the formula given for accelerating or retarding force is found, where A = force applied in lbs. per ton, V = velocity in miles per hour, D = distance in miles? And also the formula for increased velocity $D = \frac{V^2 - v^2}{70\,A}$ for a train descending an incline? A is the friction of the train, less gravity.—X + Y.

[1860.]—COMPENSATION OR PURCHASE.—Can any of your readers kindly inform me what was the nature of arrangements between the directors of the Subterranean London Railway and the owners of the properties they tunnelled under (including the municipal authorities)? Was the principle of compensation most generally adopted, or that of purchase? If compensation, about what proportion of cost did this bear to the total outlay, or to the net contracts for the works?—THOUGHT.

REPLIES.

[1827.]—LOCKING DRAWERS.—In reply to the objections advanced by "Ignoramus," I beg to say that in my drawing the notch was made rather too large. It ought to be made only as deep as the thickness of the bottom and side of the drawer. It *does not* destroy the utility of the locking drawer, and if properly done *does not* make the drawer project. It certainly would look rather unsightly on a nest of polished mahogany drawers, but my master has a nest of drawers in his office which are painted and grained, and the bar is painted and grained to match; therefore it does not get discoloured or rusty, and it gives entire satisfaction. —MARCUS WICKS.

[1845.]—BENDING VENEER.—The curtail step is always ruled by the scrool; if the rail is plumb with nose of the steps, the nose of the curtail step must be plumb with the scrool; the veneer is fixed in the throat by a dovetail wedge marked



A on the sketch, and drawn up by the wedge B, screw nailed from the back side marked C. To draw the scrool take half the width of the curtail step for the first radius, divide into 10 parts, and add another part which gives the first centre; draw a quadrant, then divide it into five parts, and come in one part for the next centre, then divide them all into five parts, and come in one part until the scrool is finished.—W. EILBECK, Cleator.

STAINED GLASS.

PERTH.—The large window in the west end of Kinnoull Church, which is 21ft. in height and 11ft. wide, has been filled with stained glass, embodying illustrations of portions of the New Testament parables, from designs by Mr. Millais. The work has been executed by Messrs. Lavers, Barraud, and Westlake, London.

STATUES, MEMORIALS, &c.

STATUE TO MR. GLADSTONE AT LIVERPOOL.—Six years ago, upon the occasion of Mr. Gladstone's visit to Liverpool, a number of gentlemen associated themselves together with the object of obtaining a statue of that distinguished gentleman for S. George's Hall. The execution of the design was subsequently entrusted to Mr. Adams Acton, the sculptor, who was to receive £1000 for the work. The result of the artist's labour has now been placed in a niche at the east side of S. George's Hall, immediately on the left of the statue of the late Earl Derby. The height of the statue is 6ft. 6in. from the stand, and the material is Carrara marble, dark veined.

MEMORIAL OF THE GREEK REVOLUTION.—The King of Greece has issued an ordinance authorising the erection of a national monument to the memory of the services and exploits of the Greek revolution. M. Tsiller, a well-known architect, has been charged with the design of this monument.

A handsome Gothic font has just been erected in All Saints Church, Landport, Portsea. The font is of lizard serpentine, and was manufactured by Mr. John Murphy, Serpentine Works, Penzance, and stands on a Portland stone plinth.

The subscribers to the fund for raising a statue to the Italian anatomist Panizza, of Pavia, have determined that it shall be of marble.

A colossal statue of the illustrious anatomist Morgagni is to be solemnly inaugurated at Forli on the centenary of his death, Dec. 7, 1871. The statue has been modelled by the sculptor Salvini.

A monument to King Robert the Bruce is to be erected on the Field of Bannockburn. An influential committee has been formed in London and in Scotland. The committee are obtaining a design from the veteran artist Mr. George Cruikshank.

WATER SUPPLY AND SANITARY MATTERS.

LORD WARWICK AND SEWAGE IRRIGATION.—The negotiations between the Earl of Warwick and the Leamington Local Board of Health, for the disposal of the sewage of the town on his lordship's estate, have been brought to a satisfactory termination, and the agreements between the Board and his lordship executed and exchanged. His lordship agrees to pay £450 per annum for the sewage, which the Board are to be at the cost of pumping to a given point on his estate, when his lordship will undertake the entire responsibility of disposing of the sewage on land prepared for its reception. The agreement is to extend over a period of 30 years, and the necessary works are to be completed by the Board, and the delivery of the sewage commenced, on the 25th of March next.

UTILISATION OF SEWAGE IN PARIS.—In a paper addressed to the Academy of Sciences, MM. Mille and Durand Claye discuss the advantages that might accrue to agriculture were the filth of Paris properly employed. All the organic matter which infects the Seine, and is ultimately washed into the sea, annually represents 1,500,000 tons of manure. At present, by a very simple system, between 5000 and 6000 cubic metres of the foul waters of the Clichy collector are daily raised and let flow to the beginning of the plain of Gennevilliers, where they constantly fertilise about 40 hectares (100 acres) of otherwise unprofitable land.

BUILDING SOCIETIES.

COMMERCIAL PERMANENT BENEFIT BUILDING SOCIETY.—The annual general meeting of this society was held recently at Burdett-road, Limehouse. From the report read by the secretary, it appears that the advances made during the past year amount to £6000, making the total sum advanced by the society £73,180; the number of advanced shares fully paid is 6464, representing £32,320, and the amount owing by borrowing members, to be repaid with interest, is £29,031 13s. 3d.; the amount invested in shares during the year has been £4972 9s. 8d., and in loans £64. 1s., deposit subscriptions to the amount of £3,223 6s. 3d., and loans to the amount of £2868 8s. 6d., have been withdrawn; the total amount of share investments is £24,651 5s. 7d., and of loans £4348 13s.; the balance in the bank at the end of the year was £715 17s. 6d.; the number of members is 748, holding 24,814 deposit shares, and 8172 advanced shares. The balance sheet provided for the payment of interest at the rate of £5 per cent. per annum on deposit shares, and £4 per cent. on loans, and shows a balance of £2546 6s. 5d. The directors recommended the payment of a bonus at the rate of 3¾ per cent. for the past year on deposit shares. The report was adopted, and he bonus declared, making a total of 8¾ per cent. for the tear.

CITY OF LONDON PERMANENT BENEFIT BUILDING SOCIETY.—The twenty-third annual meeting of this society was held on Monday evening at Radley's Hotel, when the report was unanimously adopted, and the directors retiring by rotation were re-elected. The profits of the year allowed of a dividend at the rate of £6 per cent. per annum being paid to the investors, and of an addition of £396 0s. 9d. to the reserve fund, which now amounts to £2511 1s. Thanks were voted to the directors, and to the other officers of the society.

Our Office Table.

PATENT VICTORIA STONE.—On Tuesday, last week, Captain Douglas Galton, Director-General of Public Works, accompanied by John Taylor, Esq., architect of the Office of Works, paid an official visit of inspection to the works of the Patent Victoria Stone Company in Bonner-road. We understand the demand for the Victoria Stone is increasing so fast that the company have found it necessary to take other large works on the Thames for the purpose of its manufacture.

A TALL STACK.—Messrs. Griffin and Morris have just completed at their manure works, Wolverhampton, a chimney stack, said to be the highest in the kingdom. Its height is 250ft. from

the foundation, and 234ft. above the ground to the top. The diameter at the base is 10ft. inside and 19ft. outside measurement, and it slightly narrows at 1⅛th of an inch to the yard, to the top, where the inside diameter is 7ft. The form of the stack is round, and some idea of the magnitude of the structure may be formed when we state that nearly half a million of bricks have been used in its erection. It is surmounted at the top by a broad stone cap, composed of 100 blocks, each separate stone weighing between 500 and 700lbs., the total weight of the cap being 31 tons.

COMPLETION OF S. PAUL'S CATHEDRAL.—The daily papers state that decisive action has been resolved upon to resume the completion of Wren's magnificent, but unfinished, *chef d'œuvre*, S. Paul's Cathedral. An influential conference has been held in the Chapter House, attended by the Dean, the Archdeacon of London, Canons Gregory and Liddon, Lord John Manners, Sir Stephen Glynne, Mr. S. Smirke, R.A., Mr. Geo. Gilbert Scott, R.A., Mr. Beresford Hope, M.P., Mr. Murray, Mr. Longman, the Rev. W. Scott, Mr. Penrose, &c., at which a sub-committee was appointed to prepare a public statement, and a general feeling was expressed that this great work ought to be actively promoted as a matter of national interest and importance.

A CRYSTAL PALACE FOR NEW YORK.—The Bill incorporating the Industrial Exhibition Company, which has been organised in this city to erect a permanent Crystal Palace, passed the Assembly on the 20th ult., and, having already passed the Senate, only requires the Governor's signature to become a law. The project is one of great magnitude, and as the capital—seven millions of dollars—said to be already paid up, promises to be brought rapidly to completion. The building is to be a permanent one, and after the exhibition is over will be devoted to the uses of a conservatory, botanical and zoological gardens, and to the general education of the masses in the beautiful and strange in nature.

ASPHALT PAVEMENT.—More than two years since an admirable piece of granite pavement, fixed by asphalt, instead of by lime and sand, was laid in Duke-street, Smithfield, and the experience gained there seems to prove it to be the best adapted to sustain the heavy and severe traffic of the London streets. For two years it sustained the Holborn traffic, which now passes over the Viaduct, and not a single stone has shown the slightest appearance of wear or displacement. A further portion is now being laid down inside Temple-bar. The merits of asphalt pavement are that it gives clean streets in winter by preventing the pumping up of mud from between the stones which the old system favours, and also prevents dust in summer by stopping up the source when the dust comes. The sewers will also be relieved of an immense amount of solid *detritus* coming from this source. Asphalt being impervious to water, the bed will always keep dry and intact.

"FLINT JACK" TURNED HONEST AT LAST.—"Flint Jack," the notorious forger of stone antiquities, has been sojourning a week at Malton. He appears to still have a ready sale for his base arrows, hammers, &c.; but keeps out of the hands of the law by offering his productions as facsimiles, and, for a consideration, will show his mode of working. He is said really to possess a considerable amount of archæological knowledge, which, if better directed, might before this have materially improved his position.

THE SERPENTINE.—The upper part of the Serpentine, called the Long Water, Kensington Gardens, having been thoroughly cleansed, and the bottom covered with gravel, the water has been let in to the full depth, and it now presents a vastly improved and very pleasing appearance, and no doubt will become a fashionable promenade as soon as the whole of the works in connexion with the Serpentine have been completed. By permission of Mr. Ayrton, the Chief Commissioner of Works, a limited number of boats has been placed on the Long Water, but at present no bathing is permitted in Hyde Park. It is estimated that the whole of the work will be finished and the water let in by the end of August.

BUILDING AND ENLARGING CHURCHES AND CHAPELS.—The Incorporated Society for Promoting the Enlargement, Building, and Repairing of Churches and Chapels held its usual monthly meeting on Monday, at the society's house, 7, Whitehall, S.W. Grants of money were made in aid of the following objects:—Building new churches at Armeley Hall, Holy Trinity, and Beeston-hill, S. Luke, both in the parish of Leeds; Chute Forest, near Andover; Clapton, Christ Church; Ripleyville, in the parish of Bradford, York. Rebuilding the churches at Bushley, near Watford; Denbigh, S. Hilary; and Llangwyfan, near Bangor (the two last on new and more convenient sites.) Enlarging or otherwise increasing the accommodation in the churches at Abingdon; Bamber Bridge, near Blackburn; Barnard Castle, Durham; Canterbury, Holy Cross; Littlebury, near Saffron Walden; Llantrissant, near Pontypridd; Middle Littleton, near Evesham; Norwich, S. Michael-at-Thorn; S. Florence, near Tenby; Thetford, S. Peter; and Wells, S. Cuthbert. The grant formerly made towards restoring the church at Llanfihangel Talyllin, Brecon, was increased. Grants were also made from the School Church and Mission House Fund towards building school-churches or mission-houses at Croydon, Christ Church; Dalton, near Ormskirk; in the Marylebone-road, London; Nottingham, S. Saviour; Stockwell-gate, in the parish of Mansfield; Tonbridge Wells, S. James's; and Whittington Moor, in the parish of Newbold, near Chesterfield. The society likewise accepted the trust of sums of money as repair funds for the churches at Halse-town, S. Ives, Cornwall: and Streatham, S. Peter.

THE PALESTINE EXPLORATION FUND.—The annual meeting in connexion with this fund took place yesterday afternoon in the theatre of the Royal Institution. The Archbishop of York presided, and the theatre was filled by a large and fashionable audience. After the right rev. chairman had made some remarks highly eulogistic of the objects of the fund in question, Capt. Warren, R.E., proceeded to give a very interesting account of his recent work in Jerusalem, in which he described what had been already done, and the steps that have already been taken to institute further researches. Sir Henry Rawlinson, Mr. Morley, M.P., and other gentlemen also addressed the meeting, and ultimately a cordial vote of thanks was passed to Capt. Warren for the able manner in which he has conducted the explorations in Palestine.

LAMBETH.—The Poor Law Board has approved of the plans submitted for the new Lambeth Workhouse by Mr. Robert Parris.

IMPROVEMENTS IN ROAD MAKING.—We are given to understand that experiments will be tried in a few days in one of the suburban parishes of London with a steam road rammer, which, if the promises held out by the patentees (Messrs. Gore and Green) are fulfilled, is calculated to effect a revolution in road-making and to entirely supersede the steam roller at present but slightly in use. The advantages claimed for the invention are that it combines a traction engine and rammer, hence it can be readily and easily moved from place to place; the blow given by the hammer is more certain and regular, and more effective than any given by the usual hand process, and the machine is equally applicable for roads paved with granite cubes and macadam. No injury to gas or water mains need be apprehended, as the blow from the hammer can be regulated so as to be given with the force of a few ounces or many tons, as occasion may require. The experiments are looked forward to with considerable interest, and the machine is said to be so extremely simple, that anyone of ordinary intelligence can work it.

THE EUPHRATES VALLEY RAILWAY.—The *Railway News* suggests that opportunity should be taken of the present plethora of capital in all the financial centres of Europe to carry out some of those great schemes the practicability of which every one acknowledges, and which would be of such great commercial advantage. Foremost among these is the Euphrates Valley Railway to India, a scheme which has been long under consideration, and has the approval of nearly everyone who has studied the question of communication with the East. The project has been described and referred to in the BUILDING NEWS on several occasions.

MODERN ARCHITECTURE IN WESTERN INDIA.—Sir Bartle Frere, K.C.B., will deliver a lecture on this subject at the Royal Architectural Museum, Tufton-street, Westminster, on Wednesday evening next. The chair will be taken at eight o'clock.

INSTITUTION OF SURVEYORS.—At the ordinary general meeting held on Monday, May 9th, a discussion took place on the paper by Mr. E. Ryde entitled "Parochial Assessments," and was taken part in by many members. The following candidates were balloted for, and declared duly elected:—as Member—Stephen William Williams, Rhayader, Radnorshire; as Associate—Robert Charles Catling, Needham Hall, Elm, Cambridgeshire. The next meeting will be held on Monday evening, May 23rd, when a paper will be read by Mr. R. Hall, vice-president, entitled "Notes on the Inclosure Acts, and their Results." The chair to be taken at eight o'clock. The following candidates will be balloted for, viz:—as Associates—John George Hollway, Lamb Building, Temple; Edward Rushworth Keele, 5, Frederick's-place, Old Jewry. The annual general meeting of the Institution, to receive the report of the Council, and to elect the officers for the ensuing year, will be held on Monday, May 30th, at three o'clock.

ROYAL ARCHITECTURAL MUSEUM.—On Saturday afternoon last, some of the members of working men's clubs connected with the Working Men's Club and Institute Union, visited the Royal Architectural Museum, Tufton-street, Westminster, and spent about three hours in examining casts of architectural ornaments and sculpture, and in listening to explanations which were given concerning the specimens and as to some of the leading points in the history and characteristics of styles. Mr. Edward Hall, F.S.A., conducted the party over the building, and gave an address explanatory of what was meant by architecture, and what were the aims of the art, and narratory of the development of the Mediæval styles, to which the collection at present in the museum mainly pertains. Mr. Gilbert Scott, R.A., and Mr. Wallis, the curator of the museum, also assisted with explanatory remarks.

Chips.

Lord Derby has notified his intention to give a site for the new Stanley Hospital, at Liverpool, and has promised to lay the foundation stone of the building on the 16th of June.

Mr. Robert Barnes, ex-Mayor of Manchester, has given £16,000 towards the erection of a new Convalescent Hospital in connection with the Manchester Royal Infirmary. Mr. Barnes last year gave £10,000 towards the purchase of the present Hospital.

The Marylebone Board of Guardians have resolved to execute certain works at their Schools at Southall, from plans by Mr. H. Saxon Snell, at an estimated cost of £875.

An exhibition of the drawings of students belonging to the Islington School of Art Drawing Classes for Ladies was held at the Islington Literary Institution, on Wednesday and Thursday last.

A company is being formed at Penzance for the purpose of building a promenade pier out from the Queen's Hotel, on the Esplanade. The pier will be 1000ft. in length, and at its outer end will have a stage where boats can land passengers at all states of the tide.

The number of students attending the Architectural Art Classes at the Royal Architectural Museum is very encouraging.

Timber Trade Review.

MESSRS. SIMSON AND MASON'S sale by Auction Wednesday, May 18, 1870.

200 loads Dantzic and Stettin fir timber.
150 ,, Quebec red and yellow pine.
600 ,, Quebec and Halifax birch.
150 ,, Quebec walnut and whitewood.
200 ,, Quebec elm.
80 ,, Quebec oak.
200 ,, pitch pine.
600 Riga wainscot logs.
700 loads Swedish and Norway balks.
150 Dantzic dock deals.
35,000 Quebec yellow pine, deals and battens.
12,000 Miramichi and Escoumains spruce do.
75,000 Gothenburg and Uddewalla do.
45,000 Laurvig and Porsground do.
15,000 Gefle, Wyburg, and Soderham do.
8000 Petersburg do.
20,000 other Swedish and Norway do.
120,000 flooring boards.
200 fathoms lathwood.

Spars, poles, rickers, palings, handspikes, pitch pine planks, laths, mouldings, architraves, yellow and red pine masts, &c., &c.

Archangel best yellow (short) 3 × 9	£	s.
per Petg. std.	9	15
	s. d.	s. d.
Borga handspikes ..... per dozen	2 3	to 2 6
Brahstad handspikes	5 9	

	£ s.	£ s.
Christiana best yellow 2½ × 6½, per 120, 12ft. 2½in.	8 10	
„ second do. 2½ × 6½	7 0	„ 7 5
„ third do. 2½ × 6½	6 10	„ 7 0
„ third do. 2½ × 6	5 10	
„ third do. whitewood 2½ × 6½	6 0	„ 6 5
„ yellow and white balks 4 × 4 to 5 × 5½ per load	s. d. 30 0	
„ spars (bought in).		
„ do. 4 to 6in.....per foot run	0 0⅞	„ 0 1
„ do. under 4in.....	0 9	
„ do. poles 18 to 22ft. (bought in).		
„ do. 16 to 22ft. (do.)		
„ do. rickers, do.		
Christinestadt third white 2½ × 7 per Petg std.	£ s. 10 0	£ s.
„ handsawn white 3 × 9 (bought in)	7 0	
Dram second yellow 2½ × 6½ per 120, 12ft. 2½in.	7 5	„ 7 10
Do. third do. 2½ × 6½	6 5	„ 7 0
Do. third white 2½ × 6½	6 5	„ 6 10
Do. millsawn and hewn yellow balks 5 × 5 to 6 × 6 per load	s. d. 35 0	
Do. white balks 5 × 5 to 5 × 6	30 0	
Drontheim white boards 1¼ × 8 per 120, 12ft.	£ s. 1 10	
Do. prepared yellow flooring boards 1¼ × 6½ per square	s. d. 10 0	
Do. 1¼ × 6½	9 3	
Dahls bruk 1st and 2nd white 3 × 11 and 3 × 12 per Petg. std.	£ s. 8 10	
Do. 3 × 10	8 0	
Do. 3 × 9	8 10	
Do. 3 × 8	7 10	
Do. 1st and 2nd yellow 1¼ × 9	7 10	
Do. 1 × 9	7 10	
Do. 1¼ × 10 to 1¼ × 12	7 10	
Do. ¾ × 9 to 1 × 11	7 10	
Do. 3rd and 4th yellow 1¼ × 7 to 1¼ × 9	6 10	
Do. mixed white and yellow 1 × 9 to 1¼, &c.	7 0	
Dantzic deck deals	s. d.	
Do. 1st real crown .... per 40ft. of 3in.	22 6	
Do. 2nd do.	17 6	
	£ s.	
Do. lathwood 3 to 6ft...per cub. fathm.	4 15	
Do. good middling timber.... per load	s. d.	
Do. common middling do.	68 0	
Droback spars	35 0	
Escoumains 1st white spruce 3 × 8, per 120, 12ft. 3 × 9	£ s. 13 0	
Do. 3 × 7	13 0	
Fredrickstadt 1st yellow flooring boards planed and dressed with plain edges 1¼ × 7 per sq.	s. d. 13 6	s. d.
Do. 1¼ × 6½	12 6	
Do. (short) 1 × 7	8 0	
Do. 1 × 6½	10 9	
Do. ⅞ × 7	8 9	
Do. ⅞ × 6½	7 3	„ 8 9
Do. ⅞ × 7	7 6	
Do. ⅞ × 6½	7 6	
Do. ⅞ × 6½	7 0	
Do. 2nd yellow do. 1 × 7	9 0	
Do. ⅞ × 6½	7 6	„ 7 9
Do. ⅞ × 6½, short lengths	5 9	
Do. 1st yellow tongued and grooved 1 × 6½	10 9	
Do. ⅞ × 6½	7 6	
Do. 1st yellow double grooved 1¼ × 4½	11 0	
Do. (short) do.	9 0	
Do. 1st yellow grooved, tongued, and beaded ⅞ × 6½	7 6	
Do. ⅞ × 6½	8 3	
Do. ⅞ × 7	7 3	
Do. ⅞ × 6½	6 3	
Do. (short) ⅞ by 6½	6 6	„ 7 3
Do. 1st white planed and dressed with plain edges 1 × 6½	9 9	
Do. ⅞ × 6½	7 9	
Do. ⅞ × 7	7 3	
Do. ⅞ × 6½	7 0	
Do. 2nd white do. ⅞ × 6½	6 3	
Do. 1st white grooved, tongued, and beaded ⅞ × 6½	7 0	
Do. ⅞ × 6½	6 3	„ 7 0
Do. (short) ⅞ by 6½	5 9	
Do. 1st white tongued and grooved 1 × 6½	10 0	
Do. laths ¾ × 2¼ per 100ft. run	1 5	
Do. ¾ × 1	0 6	
Do. ¾ × 3 per 120pcs.	8 3	
Do. architraves 100ft. run	1 9	„ 6 0
Do. mouldings	2 0	„ 4 6
Do. skirtings	3 3	
	£ s.	
Gefle 1st yellow 3 × 9 ..per Petg. std.	10 5	
Do. 3 × 7	9 5	
Do. 1st and 2nd yellow 3 × 7	11 0	
Do. 2½ × 7	11 10	
Do. 3rd yellow 4 × 11	9 10	
Do. 4 × 9	9 15	
Do. 3 × 9	9 5	„ 9 15
Do. 4th yellow 4 × 12	9 0	
Gothenburg 1st and 2nd yellow 4 × 11	10 5	
Do. 4 × 9	10 0	
Do. 3 × 9	10 5	
Do. 3 × 8	9 5	
Do. 3 × 7	9 5	„ 9 15
Do. 2½ × 9	10 5	
Do. (short) 3 × 7	7 10	„ 8 0
Do. 3rd yellow 4 × 9	9 5	„ 9 10
Do. 3 × 11	9 5	
Do. 3 × 7	8 5	
Do. (short) 3 × 7	6 10	
Do. 2½ × 9	9 5	
Do. 2½ × 7	8 0	„ 8 5
Do. common yellow 4 × 11	10 0	
Do. 3 × 9	8 5	„ 8 10
Do. 3 × 8	7 15	
Do. 3 × 7	7 15	
Do. 2½ × 8	8 10	
Do. 2½ × 7	7 15	
Do. 2 × 7	8 10	
Do. 2½ by 6½ and 6	7 0	
Do. 3rd whitewood 3 by 7	7 0	

	£ s.	£ s.
Gothenburg, 3rd Whitewood, 2½ by 7 ..	7 0	
Gamla Carleby handspike (tar stained) per dozen		
Halifax birch timber 16in. and up per load	s. d. 53 0	
Jacobstadt handsawn yellow and white 2½ by 9 and 8	£ s. 6 15	£ s.
Laurvig 1st white 3 by 9 .... 120, 12ft.	12 10	„ 12 15
Do. 2nd white 3 by 9	11 15	
Do. (short) 3 by 9	8 10	
Do. 1st white 2½ by 7	7 10	
Do. 2nd white 2½ by 7	6 10	
Monsteras lathwood 6in. per cub. fthm.	4 15	
Do. 3 to 6ft.	4 15	
Miramichi unassorted spruce 3 by 11 120, 12ft. 3·9	14 0	
Do. 3 by 9	13 0	
Do. 3 by 7	12 0	
	s. d.	
Memel palings, 4½ft. 3 by ⅜ .... per 120	5 3	
Petersburg, 1st yellow, 3 × 9 per Petg. std.	£ s. 12 10	£ s
do. (Gromoff's) 3 × 9	13 0	
do. (short) 3 × 9	9 10	
do. 1st white 3 × 11	11 5	
do. do. 3 × 9	9 15	to 10 0
do. do. 3 × 7	8 10	
do. lathwood 8ft. per cub. fm.	6 0	
do. do 4 5. and 8ft	5 10	
do. do. 8 and 4ft.	5 15	„ 6 0
do. do. 8 and 6ft.	5 15	„ 6 5
do. do. 6 and 4ft.	5 15	
do. rickers 21ft., 6d each.		
Pensacola pitch pine, 2 × 10 to 20 per Petg. std.	11 15	
do. do. timber, 75s. load.		
Porsground, 3rd yellow and white 3 × 9 Petg. std.	7 5	
do. do. 2½ × 7, 120, 12ft. 2½in.	6 5	
do. 3rd yellow 3 × 6½	6 0	
do. 3rd white 3 × 6½	5 10	„ 6 0
do. do. 2½ × 6½	6 0	
do. 4th white 2½ × 6½	5 10	
do. fresh spars, 4 to 6in. per foot run	0 1⅛	
do. do. under 4in.	0 0⅝	
do. 22ft. poles.....each	1 0	
do. fresh spars .....load	34 0	
do. yellow balks 5 × 5 & 4 × 5	35 0	
do. do. 4 ×4 and 4 × 4½	34 0	
do. white balks 5 × 5 & 4 × 5	30 0	
do. do. 4 × 4 and 4 × 4½	30 0	
Quebec 1st floated yellow pine, per Petg. std.	£ s.	£ s.
„ 12ft. 3 × 11	16 0	
„ 12ft. 3 × 7 to 11	16 0	
„ 12ft. 3 × 6 to 9	14 0	
„ 10ft. and 11ft. 3 × 7 to 20	14 0	
„ 8ft. 3 × 7 to 21	13 15	to 14 0
„ 10 to 12ft. 3 × 12 to 21	17 10	
„ 10 to 12ft. 3 × 7 to 10	13 0	
„ 1st yellow pine, 13ft. 3 × 11	20 0	
„ 1st dry floated yellow pine— 12ft. 3 by 11	17 0	„ 17 5
10 to 12ft. 3 × 8 and 9	14 0	
„ 12ft. 3 × 8 and 9	14 0	
„ 8 and 10ft. 3 × 11	14 0	
„ 10 and 11ft. 3 × 11	14 0	
„ 8ft. 3 × 7 to 11	14 0	
„ 1st dry bright yellow pine — 12ft. 2 × 9	16 10	
„ 12ft. 2 × 6 and 7	15 0	
„ 10 and 11ft. 2 × 7 and 9	14 0	
„ 2nd floated yellow pine— 12ft. 3 by 11	12 0	
„ 12ft. 3 by 7 to 11	12 0	
„ 12ft. 2 by 7 to 9	9 10	
„ 12ft. 2 by 7 to 14	15 0	
„ 12ft. 2 by 10 to 15	11 0	
„ 2nd dry floated yellow pine— 12ft. 3 by 11 to 21	12 10	
„ 10 to 12ft. 3 by 11 to 21	12 5	
„ 12ft. 3 by 11	12 5	„ 12 10
„ 3rd floated yellow pine— 10 to 12ft. 3 by 7 to 11	9 0	
„ 3rd dry floated yellow pine— 12ft. 3 by 11	9 10	
„ 3rd bright yellow pine— 12ft. 3 by 11	9 10	
„ yellow pine masts bought in at.....per load	s. d. 50 0	s. d.
„ red pine masts	65 0	
„ yellow pine timber	65 0	
„ do. waney	80 0	
„ red pine timber	60 0	„ 78 0
„ whitewood timber	75 0	
„ black walnut .. per cube foot	3 0	
„ birch, 16in. and up... per load	66 0	„ 70 0
	£ s.	£ s.
„ oak, under 16in.	6 10	
„ elm	6 15	„ 6 0
Riga English crown, wainscot logs per 18 cubic feet	4 15	
Do. Dutch crown do.	3 15	
Do. brack wainscot logs (bought in) ..	2 14	
Do. lathwood, 4 to 8ft. ..per cubic fm.	5 0	
Do. do., 4 to 6ft.	5 0	
Skellefteå yellow balks 6× 6 per load	1 12	
Do. do., 7 by 7 and 8 by 8	2 2	
Do. do., 5 by 5	1 10	
Do. do., 4 by 5 to 5 by 6	1 10	
Soderham, 3rd yellow, 3 by 11 Petg. std.	7 10	
Swartwick do., 3 by 11	8 15	
Stettin fir timber .....per load	2 5	
Skepsvick spars	1 18	
Skien sawn yellow balks	1 16	
Do. do., white do.	1 12	
Vefsen yellow, 4 by 9 to 11....Pet. std.	8 5	
Do. do., 4 by 6	7 10	
Do. do., 3 by 11	8 0	
Do. do., 3 by 8	7 0	
Do. white, 3 by 7	6 10	„ 7 0
Do. 2nd yellow, 3 by 8	8 0	
Do. do., 3 by 9	8 0	
	s. d.	s. d.
Do. palings, 4¼ft. ¾ by 3 .....per 120	5 0	
Vefsen palings, 4ft. ¾ by 3 .....per 120	s. d. 4 9	
Do. slating battens ¾ × 2½ per 100ft. run	1 9	
Do. Fir staves, 30in., Mille, bought in.		
Do. do., 28in., do., do.	£ s.	
Wyburg 1st yellow, 3 by 7 ..Petg. std.	9 10	
Do. do., 2½ by 7	10 5	
Do. white, 2½ and 3 by 7	7 10	

LATEST PRICES OF MATERIALS USED IN CONSTRUCTION.

TIMBER.

	£ s.	£ s.
Teak .....load	12 10	13 0
Quebec, red pine	3 15	4 15
„ yellow pine..	4 0	5 0
St. John, N.B. yellow	0 0	0 0
Quebec oak	5 15	6 5
„ birch	3 15	5 0
„ elm	4 5	5 5
Dantzic oak	4 5	6 5
„ fir	2 5	4 5
Memel fir.....	2 5	3 15
Riga	2 15	3 2
Swedish	2 0	2 13
Masts, Queb. red pine	3 10	5 10
„ yellow pine ..	3 10	5 10
Lathwood, Dant. fm.	4 0	5 10
„ St P'burg.	5 5	6 5
Deals, pr C., 12ft by 3 by 9 in.		
Quebec, white spruce	12 0	17 0
St. John, white spruce	12 10	15 0
Yellow pine, per reduced C.		
Canada, 1st quality..	18 0	19 0
2nd do.....	12 0	13 0
Archangel, yellow ..	11 0	12 0
St. Petersburg, yel...	11 0	12 0

	£ s.	£ s.
Finland	6 10	8 0
Memel	7 0	9 0
Gothenburg, yellow	8 0	9 0
„ white ..	0 0	0 0
Gefle, yellow	9 0	10 10
Solerhum	8 0	9 10
Christiania, per C., 12 ft. by 3 by 9 in yellow	10 0	12 10
Flooring Boards, per sq. of 1in., first yel.	7 6	10 6
First white.....	7 0	9 6
Second qualities	6 0	7 0
PUMICESTONE per tn	6 0	8 0
OILS, &c.		
Seal, pale .. per tun	42 10	0 0
Sperm body.....	90 0	0 0
Cod.....	42 0	0 0
Whale, Sth Sea, pale	38 0	0 0
Olive, Gallipoli.....	55 0	0 0
Cocoanut, Cochin, tun	45 0	0 0
Palm, fine	39 10	0 0
Linseed.....	32 0	32 5
Rapeseed, Eng. pale..	45 10	46 0
Cottonseed	31 0	36 0

METALS.

		£ s.	£ s.
LEAD :—			
Pig, Foreign .....per ton		18 0 0	18 2 6
„ English, W.B.	do.	19 5 0	19 7 6
„ Lead Co.	do.	18 15 0	18 17 6
„ Other brands ..	do.	18 5 0	18 12 6
Sheet Milled	do.	19 5 0	19 10 0
Shot, Patent	do.	22 0 0	0 0 0
Red or minium	do.	19 15 0	20 0 0
Litharge, WB	do.	0 0 0	0 0 0
White dry	do.	26 0 0	28 0 0
„ ground in oil	do.	26 0 0	29 0 0
COPPER :—			
British—cake and ingot .....per ton		70 10 0	71 0 0
Best Selected.....	do.	72 0 0	0 0 0
Sheet	do.	75 0 0	76 0 0
Bottoms	do.	78 0 0	0 0 0
Australian	do.	73 10 0	75 0 0
Spanish Cake	cash	0 0 0	0 0 0
Chili Bars	„	66 10 0	67 10 0
„ refined ingot		71 0 0	74 0 0
Yel. Metal Sheathing & Rods .....per lb.		0 0 6¾	0 0 6¾

MEETINGS FOR THE ENSUING WEEK.

MONDAY.—Institution of Surveyors. 8.

TUESDAY.—Institution of Civil Engineers. 1st. Discussion on "Hot Blast Stoves." 2nd. On the "Relative Safety of Different Methods of Working Coal," by Mr. G. Fowler. 3rd. On "Coal Mining in Deep Workings," by Mr. E. Bainbridge, Student Inst. C.E. 8.

„ Society of Antiquaries. 8·30.

„ Royal Institution. On History, by Prof. Seeley. 3

WEDNESDAY.—Society of Arts. 8.

„ Geological Society. 8.

THURSDAY.—Royal Institution. Lecture by Prof. Tyndall, LL.D., F.R.S. 3.

FRIDAY.—Royal Institution. 9.

SATURDAY.—Associated Arts Institute, "Association and Contrast," paper by J. P. Emslie, and Annual Meeting. 8·15.

„ Royal Institution. On Astronomy, by Prof. R. Grant, LL.D., F.R.S. 3.

Trade News.

WAGES MOVEMENT.

THE BRADFORD JOINERS AND THE WAGES QUESTION.—A meeting of operative joiners and carpenters was held on Wednesday week, at the Secular Hall, Southgate, Bradford, for the purpose of considering the wages question. It appears that last year, when a dispute arose, a Board of Arbitration decided that the men should forthwith accept payment by the hour, and that on the 1st of March, 1870, the men should receive an advance of one halfpenny per hour. Only twenty two of the masters, however, have fulfilled their engagement to give the advance, and the men are naturally dissatisfied. They appear to have determined not to strike at present, but are subscribing to a special fund to provide for eventualities. A very hearty vote of thanks was passed at the meeting to those employers who had carried out the decision of the Board of Arbitration.

TENDERS.

BRIGHTON.—For the Countess of Huntingdon's chapel, North-street, Brighton. John Wimble, Esq., architect. Quantities by Mr. W. E. Stoner and Mr. J. Chester Lansdown :—

Bruton	£6079
Ascombe	5930
Cheesman and Co.	5854
Newman and Mann	5476
Dove, Bros.	5195
Nightingale	5167
Willicombe and Oakley	5050
Sharpington and Cole	4854
Kilby	4806
Sawyer	4720
Chappell	4667
Myers and Sons (accepted)	4428

CATERHAM.—For two detached houses for John Glenny, Esq. Mr. R. Martin, architect. Quantities supplied:—

Ward (accepted)	£1730

CATERHAM.—For additions to Woodside, for J. Danvers, Esq. Mr. Richard Martin, architect. Quantities not supplied:—

Chappell (accepted)	£870

CROYDON.—For house for Mr. H. M'Kean. Mr. Richard Martin, architect. Quantities supplied by Mr. J. A. Bunker.—

	£	s.	d.
J. and A. Wright	2345	15	0
Hyde	2339	0	0
Turner and Sons	2289	0	0
Jarrett	2238	0	0
Pollard	2232	0	0
Chappell	2200	0	0
Hearle	2145	0	0
Ward	1995	0	0

CITY.—For alterations at 23, Finsbury-circus. Messrs. J. Tarring and Son, architects:—

Bishop	£446
Heeps	380
Shurman	370
Snowdon	342

DUFFRYN.—For alterations and additions (first contract) to Mansion at Duffryn, for the Right Hon. H. A. Bruce, M.P. Wm. G. Habershon and Pite, architects.

Price	£4859
Baker	4307
Lewis and Sons	3997
Bolt and Co.	3695
Beaven and Son	3454
Stride	3400

ELTHAM.—For alterations to bar, &c., at the Castle Inn, Eltham, for Mr. Edward Coppinger. Mr. Henry Roberts, architect and surveyor:—

Todd	£315
Theobald (accepted)	180

GREENWICH.—For alterations, &c., to four houses on Royal Hill, Greenwich, for E. Shallers, Esq. Mr. Henry Roberts, architect and surveyor:—

Fenn	£1059 16
Ware	976 15
Hammond	885 0
Todd (accepted)	845 0

HANLEY.—For China works, for Charles Ford, Esq. R. Scrivener and Son, architects. Quantities supplied:—

Harvey	£3891
Inskip	3860
Bowden	3734
Bailey	3695
Collis and Harken	3659
Wooldridge	3795
Bennett and Cooke	3475
Barlow	3395

HANLEY.—For Messrs. R. G. Scrivener and Co. R. Scrivener and Son, architects. Quantities supplied:—

Bailey	£1239
Barlow	1220

HANLEY.—For villa residence, for William Stubbs, Esq. R. Scrivener and Son, architects. Quantities supplied:—

Bailey	£1118 0
Bowden	1059 0
Bennett and Cooke	1050 9
Wooldridge	1040 0
Clewes and Ogden	1038 10

HANLEY.—For additions to Queen's Hotel. R. Scrivener and Son, architects.

Joiners' and Masons' work.

Clewes and Ogden	£230
Bennett and Cooke	213

Painter and Gas Fitter.

S. Scarratt	£175 0
T. Bickley	162 12

HURSTPIERPOINT.—For main drainage and other works at Hurstpierpoint, Sussex. Mr. B. H. Nunn, surveyor. Quantities supplied:—

Cole	£3581 5 7
Harris	3159 0 0
Crockett	3155 0 0
Symonds	3086 0 0
Ford	3022 7 11
Cheesman and Co.	3020 0 0
Beachmore	2999 0 0
Bloomfield	2995 0 0
Hayward	2830 0 0
Goodair	2757 0 0
Young	2750 0 0
Vickers and Crane	2747 0 0
Woodcock (Walmer)	2644 0 0

KENLEY.—For detached house for Mr. J. Young. Mr. Richard Martin, architect. Quantities not supplied:—

Ward (accepted)	£800

LONDON.—For alterations and and decoration, Corinthian Club, 316, Regent-street, W. Messrs. Hoopor and Corpe, architects. Quantities supplied:—

Spicer	£581
Graves	515
Henderson	472
Foxley	405
Tredgell and Godwin	337

READING.—For new offices, Market-place, for Messrs. Sutton and Sons. Messrs. Wm. and J. T. Brown, architects.

Woodruffe	£1389
Sheppard	1367
Matthews (accepted)	1355

RED HILL, SURREY.—For school-room in the Brighton-road. Mr. John R. Collett, architect.

	School-room.	Fittings.
Worsfold	£423 16	
Hall	407 15	£34 10 0
Osborn	398 0	23 10 6
Hooper	375 0	48 0 0

ROEHAMPTON.—For twenty cottages to be erected at Roehampton, Surrey, for Earl Spencer. Messrs. Beeston, Son, and Brereton, 27, Grosvenor Mansions, Victoria-street, Westminster, architects.

Easton, Bros.	£3928 0
Beckey and Holmes	3691 0
Wigmore	3599 10
Aviss and Co. (accepted)	3540 0

ROYSTON, CAMBS.—For the restoration and reseating of Litlington Church. Mr. George Vialls, architect. Quantities not supplied:—

Brown	£2135
Tooley	1965
Gibbons	1937
Gimson (accepted)	1791

RUGELEY.—For warehouses, &c., for Swainston Adamson, Esq. R. Scrivener and Son, architects. Quantities supplied:—

Dakin	£1757
Whittome	1539
Inskip	1519
Trow and Sons	1500
J. and H. Brown	1450
Bowden	1490
Barlow	1390

SURREY.—For two houses and shops, near Woking Station, Surrey. Mr. Henry Peak, architect.

Mason	£691 10 0
Patrick	690 0 0
Pollard and Son	684 3 7
Dickinson	682 1 9
Whitburn	660 0 0
West	635 0 0
Harris (accepted)	615 0 0

WALTHAMSTOW.—For the erection of Congregational Church and Lecture Room, at Marsh-street, Walthamstow. Messrs. J. Tarring and Son, architects.

Pritchard	£4918
Hill, Keddel, and Waldram	4693
Scrivener and White	4553
Patman and Fotheringham	4331
Shepherd	4237
Browne and Robinson	4147
Stevenson	4094
Killby	4067
Henshaw	4040
Bishop	3997

CONTRACTS OPEN FOR BUILDING ESTIMATES.

PLYMOUTH, June 10.—For the erection of a guildhall, law courts, and municipal offices. Whiteford, Town Clerk, Town Clerk's Office, Guildhall, Plymouth.

LEEDS, May 30.—For the erection of semi-detached villas at Arthington, near Leeds. William Bakewell, architect, 12, East Parade, Leeds.

STOCKPORT, May 24.—For the design and erection of an iron girder bridge across the River Mersey, within the district of the local Board. Walter Hyde, Clerk to the said Board, Stockport.

SALTBURN-BY-THE-SEA, May 30.—For the erection of the Saltburn Convalescent Home. Mr. J. Oliver, F.R.I.B.A., architect, 66½, Northumberland-street, Newcastle-upon Tyne.

NEWCASTLE-ON-TYNE, May 25.—For the erection of a Branch Office for the Royal Insurance Company. Mr. Parnell, 21, Collingwood-street, Newcastle.

HACKNEY DISTRICT, May 26.—For laying down and constructing 1210ft. of 4ft, barrel sewer, 2120ft. of 3ft. 9in. by 2ft. 6in. sewer, 1950ft. of 3ft. 6in. by 2ft. 3in. half-brick sewer, and 880ft. of 15in. pipe sewer, near the River Lea. Richard Ellis, Clerk to the Board, Town Hall, Hackney.

CROYDON LOCAL BOARD OF HEALTH, May 23.—For the construction of a building to be erected over the patent solid sewage extractors, at the sewage filters, Brimstone Barn, Croydon. R. J. Cheesewright, Clerk, Town Hall, Croydon.

LONDON, May 24.—For the supply of cast ironwork for a period of three years. Joseph Daw, Principal Clerk, Sewers Offices, Guildhall.

GREAT WESTERN RAILWAY.—NEW STATION BUILDINGS AT BIRMINGHAM, May 25.—For the construction of new booking offices and other buildings at the Snow-hill Station, Birmingham. Frederick G. Saunders, Secretary, Paddington Station.

LEEDS, May 30.—For the erection of semi-detached villas at Arthington, near Leeds. William Bakewell, architect, 12, East Parade, Leeds.

CHELSEA, May 25.—For the erection of dispensary and bakehouse. William Miller, Clerk to the Guardians, Arthur-street, Chelsea, S.W.

BIRKDALE LOCAL GOVERNMENT BOARD, May 28.—For the execution of the following works in connection with the main sewage of their district:—Contract No. 1. For the supplying and laying of about 17,976ft. of earthenware pipe sewers, up to 24in. diameter; for the construction of about 6260ft. of brick sewers, 2ft. by 2ft.; two subsidence tanks, storm overflows, sluices, forming and asphalting of approach road and wharf, &c. Reade and Goodison, civil engineers.

BRADFORD, June 13.—For the erection of a new town hall. W. T. McGowen, Town Clerk, Corporation Offices, Bradford.

THE MORLEY INDUSTRIAL CO-OPERATIVE BUILDING SOCIETY, May 26.—For excavating, draining, kerbing, channelling, stoning, forming and making a new street on their estate. A. H. Thompson, A.R.I.B.A., architect and surveyor, 14, Park-square, Leeds.

ST. ANDREW'S CHURCH, OLDHAM, 24th May.—Schedules of prices for the excavation and brickwork required for the foundations. J. Lowe, architect, 3, Chapel-walks, Manchester.

SOUTH STAFFORDSHIRE GENERAL HOSPITAL, June 9.—For extensive alterations and additions to the above, Waterloo-road, Wolverhampton. William T. Grant, Secretary.

UNITARIAN CHAPEL AND SCHOOL, HALIFAX, May 30.—For the erection of the above works. William Bakewell, architect, 12, East-parade.

HOLBECK UNION, May 23.—For whitewashing with Paris white, washing and cleaning the walls of the old material at the Workhouse Infirmary, offices, &c. Chas. Cluderay, Clerk to the Guardians.

NORTH-EASTERN RAILWAY.—Darlington Section, May 30.—For the erection of a circular engine shed, at Middlesborough. J. E. Macnay, Secretary,, Railway Office, Darlington.

NORTH-EASTERN RAILWAY.—Darlington Section, May 30.—For the erection of a large goods warehouse, at Middlesborough. J. E. Macnay, Secretary, Railway Office, Darlington.

LANCASHIRE AND YORKSHIRE RAILWAY, May 31.—For the supply of from 500 to 1000 sets of oak scantling for wagons. Wm. S. Lawn, Secretary, Manchester.

LANCASHIRE AND YORKSHIRE RAILWAY, May 31.—For the following works—Masonry, excavation, and ironwork for bridge, and altering road at Gannow, near Burnley; masonry and ironwork for foot bridge, at Chorley; masonry, timber, and ironwork for foot bridge, at Thornhill; and erection of gatekeeper's cottage, at Southport. Wm. S. Lawn, Secretary, Manchester.

HULME, May 25.—For painting and decorating the vestry hall and offices. R. Tatton Clerk to the Board.

KETTERING, May 24.—For the telescoping of a gas holder for the Gas Company.

WOOTTON BASSETT, May 28.—For the erection of a new gasometer. Mr. Gantleit, Secretary of the Gas and Coke Company.

DRIGHLINGTON WATER WORKS, May 26.—For the excavation for and laying of about 15,000 lineal yards of cast-iron socket pipes and specially-shaped socket pipes, with a quantity of hydrants and sluice valves; and also for the erection, finding materials for, and completion of a new meter-house. John Smith, Solicitor, Clerk to the Board, Birstal, near Leeds.

DRIGHLINGTON WATER WORKS, May 26.—For the supply of 10 6in. valves, 5 5in. valves, 10 4in. valves. 10 3in. valves, and 1 air valve, also 53 hydrants. John Smith, Solicitor, Clerk to the Board, Birstal, near Leeds.

BATH STONE OF BEST QUALITY.

RANDELL, SAUNDERS, and COMPANY, LIMITED, Quarrymen and Stone Merchants, Bath. List of Prices at the Quarries and Depôts; also Cost for Transit to any part of the United Kingdom, furnished on application to

BATH STONE OFFICE,
Corsham, Wilts.

[ADVT.]

BANKRUPTS.

ACT 1869—TO SURRENDER IN LONDON.

John Phillips, Baragwanath, Upper Thames-street, and Rydon-crescent, Clerkenwell, engineer, June 3, at 12—William Dedman, High-street, Lower Norwood, builder, June 10, at 11.

TO SURRENDER IN THE COUNTRY.

William Pennington, Runcorn, builder, May 27, at 11—Thomas Thomas, Ystrad, builder, May 28, at 10—William Cawood, Scarborough, builder, May 31, at 2.

ACT 1869.—PUBLIC EXAMINATIONS.

W. Kerriage, George-street, Notting-dale, builder, June 9—W. T. Turner, Howard-road, South Hornsey, builder, June 16—W. Pearson, Hull, bricklayer and builder, June 10—J. and M. Douglas, Sunderland, rope and paint manufacturers, May 31—J. and J. Dobbs, Bream, Gloucestershire, builders, June 7.

DIVIDEND MEETINGS.

C. Margerrison, Chesterfield, slater, May 26—J. Ashforth, Doncaster, painter, May 26—J. Roberts, Penrhyndendraeth, builder, May 23—E. Davies, Portmadoc, joiner, May 23—R. J. Lawton, Manchester, civil engineer, May 27—A. Biggin, Sleaford, ironmonger, May 24.

ACT 1861.—SITTINGS FOR LAST EXAMINATIONS.

F. A. Downing, Great Russell-street, engineer, June 1.

DECLARATIONS OF DIVIDENDS.

J. C. Wilson, Lime-street, City, colonial engineer, div. 1 15-32d.—J. F. Baker, Manchester-terrace, Kilburn, builder, div. 9d.

PARTNERSHIPS DISSOLVED.

Smithson and Baines, Batley, contractors and stone masons—Burnett and Wilkinson, Barnsley, joiners—Whiteway and Co., Weston, Cheshire, stone merchants—Johnson and Threlfall, Southport, builders—Dodds and Co., Rochdale joiners and builders.

Crystal Palace Company.—To Builders and others.—Crystal Palace Estate.—The Crystal Palace Company are prepared to let on building leases for a term of 99 years, certain portions of their freehold property abutting upon the Penge-road, Thicknood-road, Anerley-road, and Palace-road. Plans and conditions may be seen on application to John Norton, Esq., Architect, 24, Old Bond-street, W., or to Mr. Hart, Accountant, Crystal Palace, Sydenham, S.E

A Capital Brickfield to be Let, 17 miles east of London, having railway sidings and a large wharf. Plenty of excellent brick and tile earth, also fine sand and abundance of water. Fixed rent and royalty moderate. Immediate possession. No stock nor plant to be taken. For particulars apply to Messrs. Burder and Dunning, 27, Parliament-street, Westminster. S.W.

Wanted, a Builder's Yard, and WORKSHOPS, with Dwelling House attached, in the N.W., W.C., or N. district.—Apply, by letter, to W. H. C., 22, Southgrove East, Mildmay-park, N.

To Capitalists and Others.—To be DISPOSED OF by Private Contract an ESTATE, producing a Building Stone of a most superior kind, together with the Quarries now in work, Plant, Lime, and Brickworks, &c.—Address, in the first place, W. T., BUILDING NEWS office.

Dry Wainscot, 3 years old, price 6d. to 9d. Mahogany equally cheap, at JOHN COUMBE'S Lady Lake's Grove, Mile-end Gate.

To be Let.—The best Building Land near London.—Apply to Mr. Salter, Surveyor, 3, Kingstreet, E.C., and Sudbury, Suffolk.

THE BUILDING NEWS.

LONDON, FRIDAY, MAY 27, 1870.

THE ARCHITECTURAL EXHIBITION IN CONDUIT STREET.

WE feel that we cannot do better than follow the excellent arrangement of designs and drawings adopted by the hangers of this exhibition, by which all confusion as to what are original designs, sketches of ancient buildings, &c., has been carefully avoided. Commencing therefore with the catalogue:—

Nos. 1 to 4 and 55 represent a design for a proposed new church for White Cross District, Hereford, by Frederic R. Kempson, of Hereford: a simple, carefully worked out Early English building of an ordinary type. Mr. Kempson is this year, as he was last, a contributor of a large number of executed works; in No. 47, a group of buildings, Tupsley, Herefordshire, is shown another church, almost identical in design with the last, with some school buildings and three villas. No. 89, proposed new schools, All Saints parish, Hereford, and photographs 368 to 380, consisting of various churches and villas, showing careful study of a good type of Early Gothic design, but not remarkable for much originality or power of grouping; they, however, are an exceedingly creditable series of works, for which the inhabitants of the neighbourhood of Hereford may be thankful.

Nos. 5 to 8, Mr. Street's original sketches for the Law Courts, are old friends, always welcome. They exhibit, as drawings, most favourably the artistic style which he has made his own, and, as designs, that piquancy with which a life of thorough devotion to the picturesque qualities of mediæval architecture has imbued him. As separate fragments of the structure they each form a charming picture, but by their independent treatment they betray that in combination they would fail to make a harmonious whole. Not having here, however, the general design for the building, we are content to consider these without reference to it. Granting to them to the full the merits we have named, they seem nevertheless to be too archæological in character, and not sufficiently to fuse the requirements of this time with the style of a former one. The interior of the public hall (No. 5), for instance, would gain, we think, in dignity and suitability for its purpose if the central range of pillars were swept away and the apartment spanned with a single vault, which might easily be effected with modern science. We do not think the Salle des Pas Perdues at Rouen would be improved by its grand area being subdivided as Mr. Street's is, and we would fain see how he would treat so wide area as the engineer of the Midland Railway Station has treated his. In No. 7, entrance court and corridor from Carey-street to Equity Courts, we complain of want of rhythm in the various windows employed. No. 8, the great Record Tower, was always one of our favourites among the series of drawings of which these form a part.

Nos. 9 to 11 and 204 are by another well-known Gothic architect, Mr. W. White—the working drawings of the proposed new church of Holy Trinity, Barnstaple. It is a remodelling only of an existing structure, and a photograph and drawings are sent to show its present condition. It is boldly and broadly treated, with ample wall space. Effect of length is given to an ordinarily-proportioned nave and chancel, with an apsidal apse added to the latter, by extreme narrowness and subordination of the aisles and lateral adjuncts. The detail is of poor Perpendicular, which we presume was forced upon Mr. White by the pre-existing work he has had to deal with. The woodwork and mouldings are what we should expect from him—quaint and characteristic.

No. 12, new church at Forth End, Essex, by F. Chancellor, is a pretty pencil drawing of a picturesque design for a small church, but the reality will hardly fulfil the expectation thus given, unless great pains be taken in the execution. Some modern eccentricities, indeed, could not now be avoided without an entire remodelling the design. The over-preponderance of the roof and squat proportions of the apse are among these, but the strip of roofing covering the stairs to the tower may and should be altered. The belfry stage and spire are the happiest part of the design.

Mr. Chancellor also sends Nos. 149 and 150, working drawings of various chimney pieces and grates, showing great fertility of design of a good class. These latter are exactly the sort of drawings we wish to see specially upon the walls of this exhibition. A chimney piece is a very suitable subject upon which to concentrate a little art in the shape of sculpture or tiles, and these at Whitton Lodge, Northamptonshire, may serve as good examples of such treatment.

No. 15 is an exterior view of Allahabad Cathedral, the choir of which is in course of erection by Mr. William Emerson. Fortunately the choir is the best part of the design, and both good and, we should think, suitable to the climate in itself, but the entire design is marred by most commonplace towers and spires, which are neither good nor appropriate. The low tiled roof of the choir calls for an entirely different treatment of the central tower, and we should advise Mr. Emerson's studying that of Laon Cathedral as a model. A bold and massive treatment properly, we think, characterises his other design, No. 16, —sent in competition for the National Bank, Bombay; it is certainly too heavy in parts, and the non-concentric lines of the circular arches and their labels are unpleasant. Mr. Emerson also contributes numerous sketches made in India, which we shall notice again; among them, however, is a photograph of the interior of the above cathedral, No. 299. It has a remarkable resemblance to Mr. Burges's Cork Cathedral, explainable by the fact that Mr. Emerson was pupil to that architect. The effect of this photograph (taken from a drawing) is that of a stately version of Early French Gothic.

Photographs 296, 297 and 298 represent portions of the interior of Girgaum Church, Bombay, erected in 1869, from the designs of the same architect, and all present the same massive—almost too massive—character, possibly, however, suitable to the climate. The detail seems excellent of its class, but a trifle heavy, particularly in the furniture and accessories. No. 301, photographs of Market Fountain, Bombay, recalling strongly Mr. Burges's design for one for Gloucester, is strikingly picturesque, and well worked out in detail.

No. 18, premises in Grafton-street, by Rowland Plumbe, is a simple and fairly meritorious Gothic design for ordinary street building, but suffers from want of connection in character of design and colour of material between the upper and lower portions, and would be improved by the omission of sundry coarse notchings and other rather vulgar features.

No. 19 is a pretty sketch in Mr. Edis's manner of a picturesque design for a half-timbered house now in course of erection at Bexley, Kent.

Mr. Edis's other work, 62, south-east view of a larger mansion (place not named) is equally modest and satisfactory in drawing and design, but somewhat deficient in skyline and the grouping together of the subordinate buildings.

No. 78 is a working drawing of the design by the same architect, for a new warehouse in Budge-row, a sketch for which we noticed in the Royal Academy; there is some want of correspondence between the ground story and those above, but the latter, grouped under a large comprising arch, are satisfactory.

Messrs. George and Vaughan's designs for school buildings, Nos. 21 and 22, without being satisfactory in detail and grouping, are not without merit and originality. They have given some character even to the ventilators, and have combined a certain Mediæval treatment with modern character.

A far better work by Messrs. George and Vaughan is shown in drawings Nos. 49 and 40. The former is for a villa, and the latter for some wine stores, both being erected at Molino del Rey, Granada, for the Duke of Wellington. They have in these seized the requirements of the locality, and by these means produced an original and happy effect. Both buildings have ample broad wall surface, relieved by the contrast afforded by open arcades, and the towers are introduced in a picturesque and excellent manner. The designs look appropriate and utilitarian, but artistic withal, and the drawings, as drawings, are commendable.

No. 22 is a modest design for stables, by E. J. Tarver, who also exhibits a design, No. 17, for an organ for church in Gordon-square. The architectural detail seems to show that this is the famed Irvingite Cathedral by Mr. Raphael Brandon, and if so, we would ask why the design for its organ is not to be entrusted to that architect? The design here shown is very unworthy of such a building, and, indeed is but poor and commonplace, and not very practical, as the pipes might be better arranged, and the woodwork is but skinny and poor.

No. 23, with Nos. 44A and 44B, explain a more characteristic design for a larger stabling establishment, by Mr. Burges. It forms an entire quadrangle, entered by gateways on opposite sides; a lean-to roof, on wooden supports, gives shelter cloisterwise all round the interior. A fountain, which, if it would not frighten the horses, would certainly form an effective feature, occupies the centre of the quadrangle, and the inevitable turret, dedicated to pigeons, sticks up at one corner, but hardly so as to gather the grouping together as well as it should. The design is one we should be glad to see carried out. Mr. Burges also exhibits a beautiful drawing—coloured, we believe, by Mr. Cole—of the interior of Waltham Abbey Church. This is a grand and well-known work, full of character and thought, but open to criticism. The work to be done was difficult, as there being only the nave extant, the eastern arch needed filling in as a temporary east end. The style of the building is Norman. Mr. Burges has, we think rightly, adopted a later style for his work, to avoid confusion. But then his Early Gothic is of a French type, but exceeding any French work in colossal size of detail, and thus it absolutely dwarfs the grand old Norman work. The treatment of the ceiling, after the type of that existing at Peterborough Cathedral, is excellent and suitable in character; we should, however, have preferred to have seen borders against the walls, as the cutting off of the pattern at present without any such finish looks crude.

No. 28.—A triumphal arch erected in the City-road, Chester, on the occasion of the visit of the Prince of Wales, 1869, by John Douglas, must have been striking and picturesque.

No. 29.—Design for National Schools, York Town, Surrey, by T. H. Watson, seems a very nice design, not very well set forth by the drawing, which is heavily coloured. The centre roof should have intersected with those of the wings.

No 30.—Six designs for gate lodges, by W. Young, are full—overfull—of ornate features, and do not look like designs carried, or likely to be carried, into execution.

(To be continued.)

THE LOAN EXHIBITION OF FANS AT THE SOUTH KENSINGTON MUSEUM.

"FANS! trifles not worth our attention," might, perhaps, be our first thought on hearing of such an exhibition, notwithstanding that the *Spectator* has immortalised this "little modish machine" in one of his witty papers, and Gay considered it worthy of a poem in three books. The present collection opens with a number of Chinese and Japanese fans, just brought over by Mr. Mitford. They are, as a rule, very tasteful and curiously inexpensive. There are also some excellent specimens of Indian fans, lent by the India Museum, but the object of this exhibition is not so much to show us the different materials out of which a fan may be manufactured, such as carved in sandal wood, made from palm leaves, scented grasses, pheasants' feathers, or even beetlewings, as to set before us the fan as a work of art; and works of art most of the painted fans unquestionably are. Their subjects vary in an infinite number of ways. In this collection can be seen a geographical fan from Japan, with the route between Yeddo and Kiöto marked out upon it; a Spanish fan, containing an almanack and a globe; French fans, with revolutionary subjects; Italian fans, ornamented with paintings of Scriptural stories; and historical fans of all periods, from Rebekah and Eleazer, down to the fan painted by Tjichy, a Hungarian artist, and presented to the Prince of Wales on the marriage of the Princess Dagmar with the heir of all the Russias. Here, too, are fans interesting to the public as relics: Nos. 262 and 272 were once used by the ill-fated Marie Antoinette; the Queen exhibits one which belonged to the Princess Charlotte; and a very curious fan, with imitation lace cut in paper and medallions in water-colour, was once possessed by Madame de Pompadour. It is not possible in this journal to devote much space to an object so apparently remote from its usual province as an exhibition of fans—nevertheless, there are points of common interest which claim our attention. The exhibition has been got together with the avowed purpose—and a good one it is—of promoting the employment of women in a branch of industry in which it may well be supposed they are specially qualified to excel. We will therefore confine ourselves to pointing out certain distinctive classes under which the fans may be studied, and to which the attention of students should be drawn. Many of the French fans of the highest character, many Spanish fans, and some of the Italian ones are of the class we will call pictorial. Thus the mounts of such fans are composed principally of pictures, no doubt designed to fill the peculiar space, but still pictures such as Gay describes as subjects for decoration:—

> Paint Dido there, amidst her last distress,
> Pale cheeks and bloodshot eyes her grief express.

or—

> Here draw Œnone in the lonely grove,
> Where Paris first betrayed her into love.

Such fans have at various times been the work of the best artists of the day. Thus No. 224 is by Peter Oliver, the celebrated miniaturist of the time of Charles the First. The subject of this fan, which has been painted out square and framed, is "The Triumph of Bacchus." Again, No. 348, a French fan, was painted about 1660, by Philippe de Champagne. It has a landscape on the reverse side, by PP. Valori. There are also one or two by Lancret, and No. 126 is a beautiful work by Boucher, while among those fans whose painters are unknown, we must call especial attention to "The Queen's Fan," No. 278, the subject of which is a highly-finished copy of Guido's Aurora. Some of the Italian fans of the pictorial class are enriched at the borders and near the sticks with delicate treatments of flowers and fruits so artfully arranged as to carry the colour of the picture into the setting of the fan. No. 320 is a good specimen of such fans, while No. 82 is an excellent example of the same treatment of the mount, though the stick, which is of a subsequent date and quite plain, has been added to the fan without due regard to this artistic effect. Another class of fans may be described as a combination of ornament with pictures. A beautiful example of this is found in a modern fan belonging to the Empress of the French. In the centre of the reverse side is a medallion, painted in grisaille by Moreau; while on each side some beautifully executed amorini, with arabesque ornaments, are supporting the imperial crown and her Majesty's initials. Of earlier examples Nos. 336 and 339, wherein vignettes are alternated with Pompeian ornament, are very characteristic, and deserve study, because of the Classic taste displayed in them. Many of the English fans of the last century belong to this class of treatment, sometimes consisting in vignettes and ornament, and sometimes in medallion portraits and ornaments. Of this character also is the fine French specimen by Boucher, to which we have already alluded. We cannot close without drawing attention to the fans decorated by Vernis Martin, that celebrated Frenchman, mentioned by Voltaire, who combined coach painting, when it still required the skill of an artist, with the decoration of furniture, snuff-boxes, and fans. He invented a varnish which has stuck to his name, and given character to the works of his hands. The labours of fan painting may be esteemed lightly by some, but we opine that when we find such living French artists as Eugene Lami, Moreau, and Hamon not disdaining to devote their skill and time to such works, our countrywomen may well be proud to enter into the competition.

When we first saw this exhibition we said, "Why an exhibition of 'Fans' in preference to an exhibition of purses or brooches?" On observing that "Lady Wyatt" had sent upwards of seventy fans, with her name attached to each, or about four times as many as "the Queen," the mystery was solved. In fact it looked as if her Ladyship had bought half a gross of fans at a sale, and had induced her husband, Sir Digby Wyatt, an almost brannew knight, and who enjoys considerable influence at South Kensington, to use that influence to get up the present exhibition—a good and economical way of airing a recently-conferred title.

THE ROYAL ACADEMY.

SECOND NOTICE.

AMONG those painters popularly called "outsiders" who take a high place in this year's Exhibition, Messrs. Marks, Walker, and Prinsep stand pre-eminent, and have severally made great progress in their particular branches of art. Mr. Marks sends but one picture, No. 409, "S. Francis Preaches to the Birds." The saint is holding forth to a large congregation of the feathered tribe (taken from among all kindred nations and languages), who listen with much the same degree of attention and with certainly the same interest in their neighbours as a congregation of a more elevated species in the ranks of creation would do. The figure and face of the monk, who is the saint's companion, is excellently painted. Mr. Prinsep exhibits four works; his most important picture "The Death of Cleopatra," No. 16, is too hot in colour, and the entire composition somewhat uninteresting, notwithstanding the great care and pains displayed in the details of the background. This artist's portrait of Miss Mary Wyndham, No. 26, is a charming work, the entire treatment of the figure against the green background is excellent, and the broad-brimmed round hat of the child is most picturesque, relieving as it does the pretty round face. There is also capital painting and a tender feeling for colour in Mr. Prinsep's picture of "Reading Sir Charles Grandison," No. 40. Mr. F. Walker's landscape, No. 440, "The Plough," is a fine work. If we must criticise a performance of such great merit, we would remark that the ploughed field is a little too flat in treatment and hardly retires enough. The picture takes perhaps a more prominent place from the small number of fine landscapes in the Academy this year. The newly-elected Associate, Mr. Vicat Cole, sends two—No. 211, "Sunshine Showers," displaying a fine sweep of rolling distance; and No. 991, a work apparently entirely laid in in lemon yellow, and finished up while the artist was in a jaundiced frame of mind. No 102, "Daybreak," by J. McWhirter, deserves high praise as a poetical landscape. The sheen of the sea is finely given, and the coolness of the early morning mist well indicated. We cannot praise Mr. Brett's large landscape, taken from the west coast of Ireland. Here the poetical feeling in nature is entirely excluded, and the dry details alone given. The water is rather icy than fluent, and it strikes us as too pure in colour. Would not the waves dashing upon the rocks produce more sand-coloured breakers, and slime and sea weed wash up in the hurrying foam? No. 322 is Mr. Redgrave's principal work, "Highland Park." A bright foreground overlooks the lovely vale of Micklcham and the distant Surrey Hills—a fine prospect, but, alas! there are signs that the builder is about to intrude upon its present loneliness. Of Mr. Graham's two landscapes we prefer No. 108, "Among the Hills." Mr. Pettie's best work this year is a very clever little picture from "As you Like it," No. 909, "Touchstone and Audrey." The awkward delight on the girl's face is capitally given, and though the background reminds us a little too strongly of Millais in Rosalind and Celia, it is a work of original merit. In the same room is placed a picture called "The Acolyte," No. 947, by M. G. Brennan; the little acolyte standing in the shady doorway of a church is envying the games of some ragged urchins boisterously playing in the broad sunlight, while a pretty little girl gazes on his violet cassock and white alb with admiration and respect. It is a very prettily-grouped and thoroughly well-painted work. Near to it hangs another picture of merit, No. 943, "The Story of the Old Guard," by L. Symthe—an old soldier is drawing his campaigns on a sandy path on the ramparts of a seaside town—Boulogne?—for the benefit of an attentive group of listeners. Almost the entire end of the room in Gallery No. 4 is spoilt by the unfortunate portraits of royalty. Mr. Weigall's atrocious libel of the Princess of Wales would be a disgrace to any exhibition. Mr. Buckner has missed his vocation in life; he paints the dresses of his portraits so well he was evidently intended for a second Worth, and ought to have flourished in those days of portraiture when the head was committed to one artist and the drapery to another. There are three very charming landscapes in this room, No. 223, by W. Luker; No. 227, "Dewy Eve," by H. W. B. Davis; and No. 251, some sheep coming down a rocky path on the cliffs near the seashore, by E. N. Downward. No. 220, "A Crêche," by J. Collinson, is a meritorious little work, rather too solidly painted. No. 226, "A Tope, or Lagune Fishing Boat, Venice," by E. W. Cooke, is one of his best pictures here. There is a rather clever work by a lady in this room, though the action of the horses is somewhat caricatured, No. 237, "Cart-horses going to Grass," by Mrs. O. Newcomen. No. 311, "Out of the World," by R. Lehmann, is very agreeable both in colour and feeling. No. 324, "Sir Galahad," by A. Hughes, is in this artist's best manner. Mr. Barwell has a good portrait of Lady Wentworth, No. 330. The dress is too heavily painted and serge-like in texture. This same painter has a full-length in the last room of a lady in black velvet just about to step into her carriage, No. 249, Mrs. Frederick.

"The Wayfarers," by T. Graham, is a very clever piece of painting, and the subject is pathetically told. A musician, his wife, and child, are resting by a dusty road-side; they have evidently seen better days; the dress of the wife, together with a certain air of refinement about her, proclaim her to be by birth a lady, who has probably eloped with the dreamy violinist, her husband. He looks one of those sons of genius to whom worldly prudence and forethought are quite unknown, he is fondly cherishing his beloved instrument, and with that and his musical day-dreams is perfectly content, and quite unheeding of the wayworn fatigue and gloomy forebodings depicted on his wife's face. The baby is very well painted, and the execution of the drapery is excellent. No. 349, "Reaping," by J. T. Linnell, is a good picture, painted with this artist's usual mannerism. Mr. W. M. Wyllie's "Frère Jaques," No. 377, an old priest coming away from the château laden with presents, is a capital work. We cannot speak very favourably of Mr. D. W. Wynfield's pictures this year. His best work, No. 113, "A Communication of Importance," hangs in the second room. No 358, "Round the Fountain," and No. 387, "Confidences," are both unpleasant in colour. This painter will always introduce a bit of flaring yellow, most disagreeable in effect, into his pictures. There is a good deal of humour in Mr. H. B. Roberts's picture, No. 395, "Ah! ah! the old, old, Story!" a merry old parson meeting a pair of lovers in a lane. The man looks rather silly at being discovered, and the young woman rather indignant. The expression on all the faces is excellent. There is a pretty little landscape in this room, "The Spring-Time," by E. Opie. In the foreground a little girl in a yellow frock is picking daisies. In Gallery, No. 7, Mr. B. Riviere has a good picture, "Charity," No. 491, very pathetic in its way, of a poor girl seated on a doorstep feeding two lean and hungry beggar dogs with her own last crust. This artist has another clever subject in the great room, entitled "A Midsummer Night's Dream," where a wily fox has come by night to the hen-house to steal some fowls who are safely roosting out of his reach. Mr. Hodgson's two pictures, No. 923, "The Basha's Black Guards," and No. 1023, "Arab Prisoners," are fine works, and suggest the air of the desert. They are evidently painted by one who knows Arab life, its character, and locality, and not concocted solely in an English studio, as too many eastern subjects are. In the same room with the last-named work is Gerôme's fine picture, "Jerusalem," and also a clever picture by G. H. Boughton, "The Age of Gallantry," No. 1013.

We have not space to individualise any of the works in the Water-colour Gallery. Messrs. S. Cooper and J. Lewis are both very strong, and many young men are making for themselves a position there which they have no opportunity of achieving in the close co-operation of the water-colour societies. We may, in a future notice, have some remarks to make upon sculpture, which has claims upon our attention from its naturally close alliance with our own particular art architecture.

THEORY OF THE ARTS.

(*Continued from page* 312.)

PASSING from Egyptian to later civilisations and their art conceptions, we may just notice the Persian and Indian ideals. While in Egypt the temple element was the predominant one, in Assyria the buildings partook more of the palatial character, though many of the apartments seem to have been devoted to the purposes of religion. Mr. Fergusson, who has devoted a great deal of study to this style, observes that the buildings may be designated or characterised as "palace temples." The religion of the Assyrians and afterwards of the Persians was "Sabiism," or the worship of the "host of heaven." Though not so degraded a superstition as that of the Egyptians, it ultimately degenerated—symbolical representations and statues at length supplying the place of the simple worship of the heavenly bodies, and to deified heroes were at last delegated supreme attributes. At first the sun and moon were worshipped in the open air, till at last "sacella," or temples with images, were erected. Such was Chaldean Sabiism, as adopted by the priests of the East. Belus, among the Assyrians, was afterwards a deified hero. The Persians seem to have adopted a purer form of Sabiism under the system of Zoroaster, though it afterwards became more material. According to Herodotus, the Persians erected neither temples nor altars to their gods, the hill tops serving generally for their worship and rites. This must be taken in a comparative sense, however, for we find that fire temples were built, though they were of a subordinate character. In the "pyreum" or fire temple the sacred fire was preserved. Though of not so gross a kind as the materialistic worship of the Egyptians, the tenets of Zoroaster still led to a ceremonial observance, while the "magi" or priests enslaved the minds of the people as in Egypt. The revolting disposal of the dead to the four elements—earth, air, water, and fire—checked any monumental development of architecture, which hence was confined chiefly to regal requirements. The despotic power and hereditary monarchy of the Persians greatly assisted to develop a regal style of splendour. The Persian monarchs were, indeed, often regarded as the vicegerents of the Deity, "the King of Kings" being a common title of them. The homage paid them was an idolatrous one, and divine honours were frequently bestowed. The remains of regal architecture at Persepolis, the great halls and palaces of Xerxes and Darius, the walls of cyclopean masonry, the platforms and terraces, the massive flights of steps, the voluted columns, all indicate a style, though borrowing from Egypt and Assyria, yet conceived under a purer and less material idea, possessing more flexibility, perhaps, from the co-existence of a regal and religious state.

Let us turn to India. One of the earliest civilised countries of the world, its remains are chiefly of a later age than that last spoken of. The fertile plains of the Indus and the Ganges naturally were productive of races highly imaginative, as the natural products of the country are rich and luxurious. The "Vedas," the earliest sacred writings, gives no allusion to any outward or public form of worship. Neither temples nor images are mentioned of this early period, in which the one Great Spirit of the universe was worshipped as manifested in the sun and planets, and whose earthly representative was fire. Indeed, this primitive people were of the Persian stock, or of Indo-Germanic or Aryan origin. It was not till the Buddhist religion was introduced, about the seventh century B.C., that Indian art has any interest or character of its own. At first rock-cut or monolithic, the architecture of the Buddhists was essentially of a sacred or monumental class, consisting of pillars, towers, tumuli, halls, or caves. From the elaborate researches of Mr. Fergusson into this style of art, we are tolerably acquainted with the features and peculiarities of early Indian art development, and it will be sufficient to observe that a childish toylike character pervades it, very expressive of the climate and mode of thought, but there is in it also a great deal that is exceedingly original, ingenious, and suggestive. Jaina architecture was essentially a temple development, clever in its simple modes of domical construction and roofing; while Hindu architecture is perhaps still more interesting as a temple or religious art. In all the developments of Indian art the same toylike character is found in the detail, yet the outlines of their structures are often strikingly elegant, and display a versatile mind for invention.

In neither the Persian nor Indian conceptions of art did the intellect play such a prominent part as it did in Greek art. The lower technic and imitative qualities alone are predominant in those Asiatic developments. Imaginative and clever in their combinations of form, reflective in every sense of a sensuous and nervous race, there was yet a want of that abstract refinement which distinguishes in such a marked degree the works of the Greek architects. The Asiatics had not that power of separating ideas, the ideal from the realistic, that the Greeks had—they needed, like children of nature, representations to assist, or that kind of symbolic expression which a maturer intellect can dispense with. Their notions of matter and mind were in hopeless confusion. Leaning ever to the mysterious, they could not concentrate their minds on anything of a practical nature; their science, if we can call it such, was entirely founded on empirical rules; while their art, reaching its fullest development, expressing to the utmost the ideas that evolved it, could not advance a step further. It was for another people and nation to carry on the progressive movement of art on a more reliable basis. It was reserved for the more practical nations of the west to carry on this work. To Greece and Rome we have to look for the resumption of the conceptive power of a vigorous art. Their intellectual strength, their moral and systematic mind, were sufficient. If we can show greater poets and philosophers than Greece, we yet yield her a charm of freshness and originality we cannot possess. As a well-known writer has it, speaking of the Classic life, "It is the image *there* only to be seen of our highest natural powers in their freshest vigour. It is the unattainable grace of the prime of manhood." The most common-place relics are "models for our highest art." The chaste simplicity and grandeur of Greek architecture is pre-eminent, whatever notions we may entertain of its flexibility and its applicability to modern wants. The same, indeed, may be said of Greek poetry, philosophy, and sculpture. A keen sense of the beautiful distinguished them all. Possessing a high degree of mental originality, and unrestricted by sacerdotal interference, despotic authority, or by the obstruction of castes, the poetic element soon found exercise. The religious mythi aided to create a sort of æsthetic-spiritual culture, which Orpheus in his religious hymns, Homer in his national epic poems, and Hesiod in his mythocosmogonal works, rendered immortal. Again, Plato and Aristotle embraced the highest aims of humanity and reason, and drew a distinction between the world of sense and the super-sensuous that has exercised a powerful and never-dying influence over mankind.

What African and Asiatic civilisation failed to accomplish, Greece did. It was to subordinate the coarser faculties of nature to another and higher faculty, the intellectual. The human figure, which was degraded to the purposes of gross superstitions by the Egyptians and Assyrians, transformed into monster shapes, now began to assume that prerogative of a Divine nature which the Greeks always identified with the "Beautiful," the chief attribute of the moral system of Aristotle. Previously the natural faculties only aimed at representative art, degrading it to the lower passions and the lowest ideals. Now it aimed at a far higher conception, and achieved a nobler purpose. An idealised nature was what Greek art aspired to, and its religion was almost pure maturalism. The very gods of the Greeks were more the creatures of the imagination than of religious need, and "the most finished perfection of the natural faculties was the dream" of the Greek.

Examining the masterpieces of Greek architecture—the Parthenon, for example—the same idealised conception and expression is manifest.

Though Grecian architecture undoubtedly owed much to Egyptian and Assyrian art, the Greek mind soon developed a style essentially original in its mode of expression. In Athenian architecture at least, the two races that combined to create such sublime works of formative beauty—namely, the Pelasgic and Dorian races, or the Ionic and Doric elements—were about equally concerned. In the Parthenon we do not get the expression of material power of the Egyptian temples, nor the variety of the Roman and later phases of art, but we have that higher and rigid intellectual expression which depends on a more perfected system of proportion, and that exquisite perception of the refinements of form and outline which an earlier civilisation could not attain to. Indeed, the kind of beauty of which the Parthenon is a type fitly reflects the abstract and philosophic mind of the Greeks; it stands as an embodiment in form of the intellect, simplicity, and grace of the period The minute optical adjustments, the curves employed with such delicate precision, the mouldings, the finish bestowed upon every part of this model of Greek taste, are so many indications of that refinement of mental culture and abstraction in design which so pre-eminently distinguished the Greeks. The representative office of sculpture was nicely subordinated to the architecture, not as in Egyptian and Assyrian and Indian art, often taking a paramount place. Again, colour was subordinated to form; the sculpture was often relieved by colour, the backgrounds and mouldings being painted, but never to destroy or interfere with the value of the architectural forms, and never in exposed situations.

G. H. G.

(To be continued.)

STEAM ROAD ROLLING.

WE have received the report of the Metropolitan Board of Works on the economy of steam road-rolling, written by Fred. A. Paget. It is an important report, and well worthy of the careful attention of all interested in the question. Probably we shall refer to the report at length in a future number. The following is what Mr. Paget says on the economy of steam rolling:—

Results in Paris, Liverpool, Sheffield, and Maidstone.—The results obtained on the numerous roads steam-rolled in Paris for more than seven years have led to the general belief amongst those best fitted to judge that, with the same expenditure, a road rolled by steam lasts double the time of that rolled by horses. Starting from these results, and assuming that the steam-rolled roads would last twice as long as the present, Mr. Heaton, of Birmingham, calculated that an annual saving of £5700 to that town would be effected by the use of the steam-roller; the present annual expenditure for road material alone amounting to as much as £13,000. Though hesitating to assign a precise figure to the amount of saving effected by road-rolling, Mr. Newlands, the Liverpool borough engineer, wrote in October, 1867, with regard to Messrs. Aveling and Porter's 30-ton roller:—"Our roads are in much better order, and easier kept clean, than before its use, and our bills for macadam are not so heavy." Mr. Newlands expects, however, that "the saving in macadam by every coating being at once consolidated will be very great, though he cannot at present put a value on it." During the last two years, Mr. Samuel F. Holmes, the Borough Surveyor of Sheffield, has "used a steam road-roller made by Messrs. Aveling and Porter." He finds "the saving in the cost of macadamised roads to be even greater than when rolled with a horse-roller," but he is "not yet in a position to give exact figures." He has no doubt it will increase the saving at least 40 per cent. over unrolled roads." Mr. Edward Buckham, the borough surveyor of Maidstone, writes us as to the steam-rolling carried out there in March, 1868, with a 15-ton Aveling and Porter roller, that "the results obtained from using the roller are economy, durability, comfort, and uniformity of section of road." Mr. Buckham considers that the constant use of a steam road-roller would effect an economy in road-maintenance of "at least" twenty per cent.

Figures and Opinions of London Road Surveyors.—Mr. Howell, surveyor of roads in the district of S. James, wrote in October, 1868, that by means of steam-rolling "the material is saved. The stones being forced into a soft bed, will not be fretted away as they would be when exposed to horses' hoofs and wheels," and he considers "that the use of a heavy roller ought to reduce the cost of maintaining roads from one-third to one-half, with a better road." He says that two-thirds of the material are saved. Mr. Howell has reported to Mr. Tomkins, the surveyor of the parish of S. George's, Hanover-square, in 1867, that his vestry "had a roller weighing 20 tons; this was, in his opinion, unwisely sold. The small use made of it convinced him, or assisted to convince him, that our method of forming macadam roads without a roller is a mistake." "In favour of the use of a sufficient roller in the formation of broken granite or gravel roads the reasons that might be adduced are numerous; but perhaps the most potent is economy, not only to ratepayers, but to every owner of a horse." Mr. Tomkins, of S. George's, says that one-third of the material is saved. Mr. Mann, the superintendent of the department of Her Majesty's Commissioners of Works, informs us that his experience in steam-rolling, as compared with horse-rolling, "leads him to conclude that the estimate of a comparative economy of one-third in material and labour would be much below the mark." He considers "the adoption of the steam roller generally most desirable;" and recommends that "the road be properly lifted and coated, and the interstices filled with good hogging." Mr. R. R. Arntz, the surveyor of the Board of Works for the Westminster district, in the report previously alluded to of November, 1866, states his opinion that steam-rollers "are a valuable invention, and that they could be used with advantage on the macadamised roads of London." Among other London parish and district surveyors we may mention Mr. Pratt, surveyor of Islington; Mr. Henry Cormack, surveyor of the eastern district, and Mr. John A. Clements, surveyor of the western district, of Islington; Mr. Browning, of Marylebone; Mr. Greenstreet, of St Saviour's, Southwark; Mr. Pattison, of Chelsea; and yet others. Mr. Cormack writes:—"No doubt a saving is effected by at once consolidating the granite instead of allowing a portion to be ground to dust by traffic, then to be carted away as mud. The additional durability must be proved by time, and will greatly depend upon the quantity of hogging or other binding material used during the process." Mr. Clements states that "one of the great advantages in the wear of a rolled road is, that the stones are all at once consolidatsd into one mass, the corners of the stones being undamaged; whilst in a road where the traffic has to consolidate the new metal, the whole of the stones, both on the surface and beneath, get rounded, forming so many pebbles, which roll to and fro in all directions, giving an immense amount of labour and attention afterwards." Mr. Browning, the surveyor of Marylebone, says he is "decidedly in favour of rolling granite roads either by horse or steam (the latter where practicable)." "An advantage is gained in every way." Mr. Greenstreet, of S. Saviour's District Board of Words, writes that he is decidedly "of opinion that roads thus made will wear much longer than under the old rough and cruel system." We have seen it stated by a correspondent of a daily paper that in 1866 a steam-roller tried between Highbury and the omnibus yard made an excellent road, which "remained one year and three months apparently quite good, without one spadeful of granite being put on it, although other portions of the same road within the same time required three coats of granite to keep it in equal repair.

The Road Metalling used in London.—Where, as in London, the metalling is of a very costly character, and yet, from its very hardness, only "run in" with difficulty by the ordinary traffic, most favourable results as to economy may be expected. The average price of the London five ounce granite metalling may be stated to be sixteen shillings per ton delivered on the roads. As evidence of the great proportion that the price of the metalling enters into the expense of road maintenance in London, we may state that Mr. Henry T. Tomkins, the surveyor of the roads in the district of S. George, writes us that Bond-street cost during the past year £245 for maintenance, not less than £216 of which were for metalling. The macadamised portion of Piccadilly cost £1384, of which £1359 were spent on metalling. According to the 1868-9 published return of expenditure of the Board of Works for the Westminster District, Bridge-street, cost 3s. 6½d per square yard, or a total of more than £341, of which more than £305 were spent on the granite alone; Parliament-street, £528, of which £473 for metalling; Victoria-street, £869, of which £744 for broken granite; Kensington-road, £1588, out of which as much as £1414 were spent on the cost of the granite. Nevertheless, in spite of its great hardness, the Guernsey granite is sometimes worn before consolidation on the London roads into smooth, irregular balls, specimens of which we have now before us. The economy produced in road maintenance would evidently be in proportion to the cubical contents of the metal required; or in proportion, *cæteris paribus*, to the amount of the traffic, and this would be in favour of the London roads.

In many German districts where rolling is employed on cheaper metalling, the expenditure for metal only amounts to about fifty per cent. of the total cost of maintenance.

ARCHITECTURAL ASSOCIATION.

AT the usual fortnightly meeting of this Association, held on Friday evening last, Mr. Lacy W. Ridge, President, in the chair,

Mr. T. H. WATSON read a paper

ON MONUMENTAL SCULPTURE.

This paper was supplementary to one read before the Association last year by the same gentleman.* After some introductory remarks and a brief résumé of his former paper, Mr. Watson entered at some length into the subject of Greek sculpture, by the study of which architects would be able to get some perception of those qualities which are undoubtedly necessary for all monumental sculpture, and without which it cannot be applied to architecture without detriment to the highest forms of both. The Greeks had a power of execution, and a wealth of imaginative story that linked itself to the creation of the boldest and finest works. Architects in the present day are very liable to go astray in adopting the most finished style of the Greeks as a point of departure; indeed, much of the weakness of modern sculpture comes from the endeavour so to do, instead of getting at the simpler principles and truths out of which the Greeks' wonderful perception of the beautiful and their delicate manipulation enabled them to create what architects in the present day would emulate. Some of the earlier pre-Phidian art, together with the Mediæval sculptures of the best times, will be more useful in the present day to architects in determining rules of practice, the ultimate application of which should be directed to the production *not* of affected and imperfect copies or translations of the weaknesses visible in the works referred to—faults arising always from want of anatomical knowledge, mechanical appliances, and technical skill—but rather to the creation of works perfect, as far as all existing advantages go, in mechanical and technical skill, but having primarily earnest intention—a plain motive told plainly and in the most straightforward manner, and in stone. The material must never be forgotten. Sculpture in conjunction with architecture must grow out of the architecture—be an essential part of the design, not applied or stuck on as so much ornament put into niches or otherwise. Mr. Watson thinks the niche is a great mistake, and the statue put into it merely an ornamental appendage, without reason or utility to justify its introduction. The simplest idea of sculpture in the round forming part of an architectural composition is that it should be functional, or used to emphasise and mark functional members of the composition. The figures on the angles of the Ducal Palace at Venice are an elaborate example of this treatment; and throughout all Mediæval art many far simpler specimens may be found in which the parts sculptured have projection sufficient to give them the desired relief and importance; but they are attached to, grow out from, and are, in fact, cut out of the same stone as the functional members they emphasise, whether it be quoin, column, or arch-stone. When this ligature is cut, sculpture commences to have a separate existence; it gradually becomes the subject of another branch of the art family—becomes, indeed, a distinct work of art, requiring different conditions under which it may be seen so as to be understood; it

* BUILDING NEWS, Vol. XVI. pp. 373 and 383.

should then be placed in a gallery where it can be viewed all round, but it can no longer be a subsidiary member with others of a work in which, perhaps, it has become a discordant element. Figures carved in low relief are the natural first steps of this principle; the stone on which they are carved forms a portion of the solid structure of the building, and this application of sculptured forms is that which we should first adopt in our works. High relief, and ultimately the round properly used, is an elaboration of this, which can only be obtained at a greater cost. It is necessary to qualify the round by saying "properly used," or we should get at once a contradiction between what it has been attempted to show is a principle, and what we know to have been the practice of the Mediævalists and the Greeks in their finest periods. But a careful consideration of those works in which they did actually sever the material and sculpture the figures all round, will prove the truth of what has been stated; for apart from all considerations of ease with which works of such great magnitude could be handled, and the obligation a true artist is under to finish to his utmost whatever his hand may reach, and which has given to us what was never intended for the enjoyment of the Greeks—viz., the back of the Theseus, said to be the finest thing in the world—it is evident that the purpose and intention of the work can be made by the power of the artist to ride superior to the accidents of position and even of the material itself; and one can hardly view these fragments as they now are without resetting the figures in their original surroundings, while with all the life and movement in them, and with the largest and broadest treatment that has ever been produced, there are certain strongly-marked lines of composition, a balance and order of the parts, which distinguish the work immediately as having formed part of an architecture in which they were the chief and the noblest ornament. Severed in reality, the pervading spirit of the master Phidias lived in the whole, and fused the mass into one design, and they are as essentially parts of the structure as though they had never been (for greater perfection of finish) wrought on the ground instead of *in situ*. The principles on which sculpture should be designed may be founded on the consideration that it should never be allowed to run away from its ground, but be ever attached to, fused into, and form part of the structure. This clearly settled, most other rules spring from it. The actions will not be violent, the movements of the composition will be more or less limited, as the work is more or less in relief. We find in the best period of Mediæval sculpture, when the figures are most advanced towards and reach absolute roundness, a very strong recognition of their architectural parentage. The arms and legs are not cleaving the air, the drapery falls but little affected by wind or movement, the figures are columnar, and cleave to the strongly-marked vertical lines of the composition of which they form a part.

The influence of costume is very great on the artists of any period, from the fact that, material and objective as it is, putting aside all moral considerations, an artist in a living and progressive art period must represent and render in stone the objects he sees, the daily life he lives, and the social condition of the people and time in which he is placed. No great period of art has ever been in which the artists generally and almost exclusively sought in previous periods of history the subjects of their works or the personages and costumes of previous times. The object of the artist should be to stamp upon his work the image of the time in which he lives, and to hand down to those who shall come after him a true mirror of those influences that surround him. It may be said that this is not an age of sculpture but of pictorial art, with its colour and semblance; that variety, restlessness, and show are the main characteristics of our social condition at this time; and that artists should devote themselves to the representation of those aspects of our existence, and what is a quality of art, exaggerate within certain limits the natural development of it. This would be to leave the less sensuous art of sculpture altogether to neglect; but this will not suit architects, who find in sculpture their most useful and graceful ally. Nor are there wanting thoughtful men and women who by their works and influence would give to this too-frivolous age some sort of love and respect for those qualities of chivalry and nobility which have afforded subject for all the art-representation we admire; but the masses are difficult to reach, and adverse powers are immense, and too much used in the opposite direction. Still, sculpture cannot be allowed to be starved out because we will not provide for its sustenance those solid and enduring accessories to our lives which are more absolutely necessary to it than to any other art. While we persist in hiding and smothering up under superficiality and meanness the noblest impulses we feel, we cannot alter things; we must be content to take them as we find them. But we may hope for better times, and work onward. We may use our reason to modify and correct those evils which it would sometimes appear are inseparable from a high state of civilisation. Mr. Watson next proceeded to describe the parts of costume that have been common to all art periods, the facilities they gave to the artist's work, and so indirectly served to promote the influence and expression of that art. In the course of these remarks he said that in all the earlier dresses very simple forms were used, loosely flowing about the person, and leaving the limbs unconfined, the drapery being wrought with the needle, and damasked over with colours and figures that did not interfere with, but rather marked out its folds. All this was excellently adapted for sculptural representation, and at the hands of artist-workmen received different renderings according to the material. The Greeks wore so fine a tissue as to be almost transparent, and their sculptors rendered this in a manner which reveals the whole form within. It has been said by some that they went out of their way to wet the garments they threw over their models, but on looking carefully at the Greek figures you will see plainly that it was no such thing; they saw through the tissue which encompassed the figure, and they represented what they saw, not what they knew it to be. The mutilated female figures in the room of the hog's back tombs in the British Museum show how this thin tissue, fluttering in the wind, is treated. The Mediævalist saw a heavier and a warmer covering, and he rendered it in that fine bold columnar appearance of the figures, not wanting in life and movement, as will have been noticed in the statues of the porches of Chartres, some of which have been beautifully drawn and lately published by Mr. Lonsdale. These statues are indeed sermons in stone, speaking in earnest language and forming a part of the architecture even more thoroughly than those of any previous art, that of the Greeks not even excepted. No people seem to have felt the strictly sculpturesque treatment of the human figure as these thirteenth century imagiers seem to have done in hewing out their figures on the building side by side with those who worked the canopies and pedestals. These sculptures seem to combine all that is noble and best in monumental art, loveliness, and truth to nature in expression, motive, and action—action fined down to the least possible mobility, so as to sustain the lines of the architecture, from which it is no disparagement to them to say that they cannot be separated without loss of force and beauty. The form of the block of stone often influenced the composition of the figure, and it is evident also that in some instances the original intention has been departed from in some of the Mediæval statues from conditions imposed by the material itself, after the original design was made. But what is most important, the sculptors were not content with a limping literal representation of the thing they saw, which would have resulted in a poor naturalistic art. The same mental process which with the Greeks produced their ideal of lovely form from high intellectual nature, with the Mediævalist resulted in a grand religious and chivalrous creation of moral excellence. After briefly referring to the difficulties met with in the modern practice of sculpture, the author concluded by saying that he could not pretend to point out how these difficulties were to be met. We can all see, he said, that the old men had difficulties, we can see something of the methods they used to lessen or obviate them, and most interesting such things are to the careful student. We may each do something to lessen the amount of this difficulty, and we really ought to try and lend a hand to our sculptors in this matter, and not leave them to the great trouble, whenever they come to make the statue of a man, of devising some way in which to represent him other than that in which he was known to his fellowmen, and so that we should not see our worthies coming out in togas or "blankets" they never wore in life, and with a general looseness of appearance suggestive of moral attributes directly contrary to those for which they are immortalised.

Some remarks on the paper having been made by the Chairman, Mr. Lonsdale, and others, the usual vote of thanks to the reader of the paper terminated the proceedings.

THE ROYAL ARCHITECTURAL MUSEUM.

WE have just received a copy of the annual report of this museum. Her Majesty, the fountain of all honour, has in the plenitude of her boundless generosity, permitted the Architectural Museum to designate itself the Royal Architectural Museum. The report says Her Majesty has not only "condescended" to become its patron, but has done it the "double honour" of permitting it to be called "royal." We should have thought that Her Majesty honoured herself by honouring such an institution. But let that pass.

After glancing at the opening of the museum, and recording thanks to all who have substantially assisted in its formation, the report says:—

"The Council are now negotiating with the Royal Academy for an exchange of Classic for Gothic work; and with the South Kensington Museum for the loan of nearly 500 casts from Amiens and other places on the Continent and in this country, in return for casts from the Bartle-Frere Indian sculptures belonging to the Council

"The formation of a library of reference for students and art-workmen has been determined upon, the sum of £10 towards the necessary fittings, and some valuable works, having been already promised by Mr. Henry Vaughan; it is hoped that other donations in books or in money for their purchase will follow.

"By far the most important practical item of this report has yet to be mentioned, viz., the formation of the Architectural Art Classes under the direction of a joint Committee of the Royal Institute of British Architects, the Architectural Association, and the Architectural Museum; each body contributing as it is best able—the Institute in funds and influence, the Association in the working arrangements, and the Museum in giving up a large and well lighted room, and the use of its collection. Too much cannot be urged in favour of this organisation, embracing as it does, classes for

1. Drawing from the flat and round.
2. Drawing from life.
3. Modelling.
4. Colour decoration.
5. Water colour drawing.
6. Perspective and sciography.
7. Architectural drawing.

"For particulars applications should be addressed to the Hon. Sec. to the Joint Committee, Lacy W. Ridge, Esq., 23, Bedford-row, W.C.

"The Council have decided for the present upon opening their Museum on the evenings of Tuesday, Thursday, and Saturday, from 7 to 9·30, commencing with Thursday, June 2, to enable many to study in it who are engaged during the day."

After speaking of the financial condition of the Museum, which is not very encouraging, the report gives utterance to the following complaint:—

"The Council have been in communication with the Commissioners for the Annual International Exhibitions of Art and Industry, and have made suggestions for co-operating with them in a work like the Museum, dating its commencement from the year 1851. The Council are at a loss to understand the absence of their President's name on a Commission which includes the Presidents of the Royal Academy and the Institute of Civil Engineers."

Would it not have been wiser to have said nothing about the absence of their President's name on the Commission, or to have communicated with the Commissioners privately?

CHURCH BUILDING IN CORNWALL AND DEVONSHIRE.

TORQUAY.—Plans for the further decoration of S. Luke's Church have been approved and adopted. The plan for the screen consists of a base of stone, with panels of incised alabaster, the other parts to be wrought iron, with polished brass staples, rosettes, cresting, and cross. For the decoration of the sacrarium and choir, it is proposed to illustrate the *Te Deum* with nine groups of angels, ornamented with vine foliage, &c. The roof of the choir will be illustrated

with twelve subjects, viz. :—Angels of our Lord, the heavens, sun and moon, stars of heaven, lightning and clouds, mountains and hills, green things, whales, fowls, beasts, priests of our Lord, &c., whilst the intermediate panels will be filled with the words of the Canticles, and the colouring similar to that of the rocks of Torquay, viz., black and red, with white veins running through them. The wooden ribs will be decorated with gold and colour in a similar manner to the south transept of Hereford Cathedral. The cost is estimated at £600. Mr. Blomfield, of London, is the architect.

S. ENODER, CORNWALL.— The Church of S. Enoder, situated a few miles from the town of S. Columb, having undergone partial restoration at a cost of £900, has just been re-opened by the Lord Bishop of the diocese. Prior to the commencement of the work, the church was in a most dilapidated condition, and it became especially necessary that the roof should receive prompt attention, the restoration of the other parts being simply deferred on account of a difficulty in the way of raising the whole of the necessary amount at once. From the designs of Mr. J. Piers St. Aubyn, the chancel roof has been completely rebuilt, and the whole of the chancel restored. The remaining roofs have been very substantially repaired—in fact, they have been new slated throughout—but the old timber on the inside has not been removed. The south chancel aisle has been rebuilt, and three new windows erected ; and it is hoped that, by the end of the present year, sufficient money will be raised to enable the church to be reseated, open benches being substituted for the chairs now in use. The new pulpit, lectern, and the fittings at the altar, are the gift of the vicar. The contractors were Messrs. Carah and Edwards.

LANIVET, CORNWALL.—Funds are being raised for some additions to this very pretty little church, restored some five years ago from the designs of Mr. Piers St. Aubyn, architect, of London, at a cost of £1600. This church is generally supposed to stand exactly in the centre of the county, and consists of nave, chancel, and north and south aisles. A piscina, or stoup, of elaborate sculptured Pentewan stone, stands on a granite pedestal at the south side of the chancel. In the south wall are the rood stairs, in good condition and open, and two large apertures in the spandrels of the opposite arches mark the position of the ancient rood-loft. The arcades each comprise six four-centred arches of S. Stephen's stone, supported on pillars of the same material. The tower arch is of handsome proportions, and richly moulded. The tower itself is of three stages, strongly buttressed, and finished with battlements ; it contains six bells, on one of which is inscribed, "Peace and Good Neighbourhood," while the tenor bell bears the following couplet :

I to the church the living call,
And to the grave I summon all.

Prior to the restoration in 1864 the roof was of the barrel kind, so common in Cornwall and Devon. A series of most interesting paintings in distemper were discovered, chiefly in the south aisle, the principal being a figure of Christ eight feet six inches high, painted in black, yellow, and claret, the back-ground being filled in with various instruments of torture. The preservation of these paintings was a matter of impossibility, but the rector has retained careful copies of them all.

TIVERTON. — GREENWAY'S ALMSHOUSES.— The interesting and elaborate little chapel connected with this building has been carefully restored under the direction and from the designs of Mr. E. Ashworth, architect. Although remarkably small—being but 14ft. square by 17ft. high, this chapel contains a wonderful amount of carved stonework in the Late Perpendicular style, and is extremely profuse and rich in excellent examples of the art in that period. Groups of saints and angels, figures of animals, &c., abound, and there are numerous quaint inscriptions upon the exterior walls, which have until the present restoration been covered with plaster, and become illegible. These have been now brought out, those letters which have become corroded by time have been restored, and the accumulated dirt removed from the others. Beneath the cornice, in raised letters of about five inches deep, occurs :—

Have grace, ye men, and ever pray,
For the sowls of John and Joan Greenway.

And under the west window :—

Rest awhile, ye that may,
And pray for us by night and day.

There is a new open roof of stained and varnished deal, and the four niches have been filled with figures of SS. Blaise, Ann, Peter, and Christopher. John Greenway, the founder of these almshouses, rose from a low station to that of a merchant of great eminence, and having no children, devoted the greater part of his immense wealth to the benefit of the poor and public. He founded these almshouses in 1517, and about the same time took down and rebuilt the north aisle of the parish church of S. Peter, erecting a large and curiously-carved porch in front. He built a rich screen between the chancel and nave, and was buried, in 1529, in the vault under his chapel. The inscriptions there indicate somewhat of his turn of mind and character :—

God speed our way ;
Pray for the soul of John Grenwaye.

O that the Lord maye
Grant under John Grenwaye
Good fortune and grace,
And in Heyven a place.

Whilst we think well, and think to amend,
Time passeth away, and death's the end.

To the honour of St. Christopher, St. Blaze, and St. Ann This chapel by John Greenway was began.

On the brass on his tomb, now partly missing, was engraved :—"Of your charity pray for the souls of John and Joan Greenwaye his wife, which died 1529, and for their faders and moders, and for their friends and their lovers—on them Jesu have mercy. Amen. Of your charity say Paternoster and Ave." Mr. Sandall has executed the wood-carving of the roof. The restoration of the stone-carving, together with the sculptured work, has been satisfactorily executed by Mr. Harry Hems, and Mr. Physick, of Tiverton, was the contractor for the masonry and woodwork.

S. GERMAN'S CORNWALL. — The fine old church at S. Germans, the cathedral of the ancient Cornish diocese, is to be restored. It is exceedingly interesting to antiquaries and ecclesiologists, since it possesses the finest Norman doorway in the West of England, and has many other portions of pure Norman work, and further in its second tower, which is a remnant of the old priory. J. V.

BUILDING NEWS SKETCH BOOK.—No. XXIX.

DOORWAY OF ADEL CHURCH, YORKSHIRE.

THE village of Adel or Addle, about four miles N.W. of Leeds, is one of the few places that can boast of possessing an old Norman church, much in its original state.

The doorway is a very rich specimen of Norman work, in tolerably good preservation, and with the exception of a touch or two on the exterior moulding of the arch, is in its original state. The chevron mouldings of the arch are almost perfect, but the beakheads are a good deal decayed. The capitals of the pillars and piers on the left hand side are nearly obliterated, while those on the right are in very good preservation. The mouldings generally on the left hand side are in a more advanced state of decay than those on the right. J. S.

SUGGESTIONS FROM NATURE.

"COMPOSITION taken generally," says Sir Joshua Reynolds, "is the principal part of invention, and is by far the greatest difficulty the artist has to encounter. Every man that can draw at all can execute individual parts, but to keep those parts in a due subordination, as relative to a whole, requires a comprehensive view of the art, that more strongly implies genius than perhaps any other quality whatever."

Invention consists in bringing together certain ideas which the mind has treasured up in the course of study, thus making new combinations out of old materials. It necessarily follows that much knowledge and high cultivation of mind must exist to enable the artist to work with "little bits" in this manner, so as to conceive and produce objects so complete in their proportion and arrangement that none shall detect the means whilst looking at the result. Thus it will be evident to the artist that nothing can more tend to exalt his taste and strengthen his judgment than a close and unremitting study of ancient authorities and natural forms, together with much and appropriate reading.

To excel in design we must rely principally on our own powers of comparison and observation, ever searching up materials for thought and hints to put into practice. With a view to assist the student we have illustrated this week a few suggestions for ornament. These consist of the buds, leaves, and flowers of various plants, some of which are enlarged from nature, viz. :—

No. 1, Butter cup.
Nos. 2, 17, Woody Night shade.
Nos. 3, 7, 10, 14, 15, 23, 24, Geranium.
Nos. 4, 13, 18, 21, Columbine.
Nos. 5, 6, 8, Groundsel.
No. 9, Dead leaf of plane tree.
No. 11, Forget-me-not.
Nos. 12, 19, Young celery.
No. 16, Mignonette.
No. 20, Canariensis.
No. 22, Heliotrope.
No. 25, Parsley, seed leaves.
No. 26, Maple.

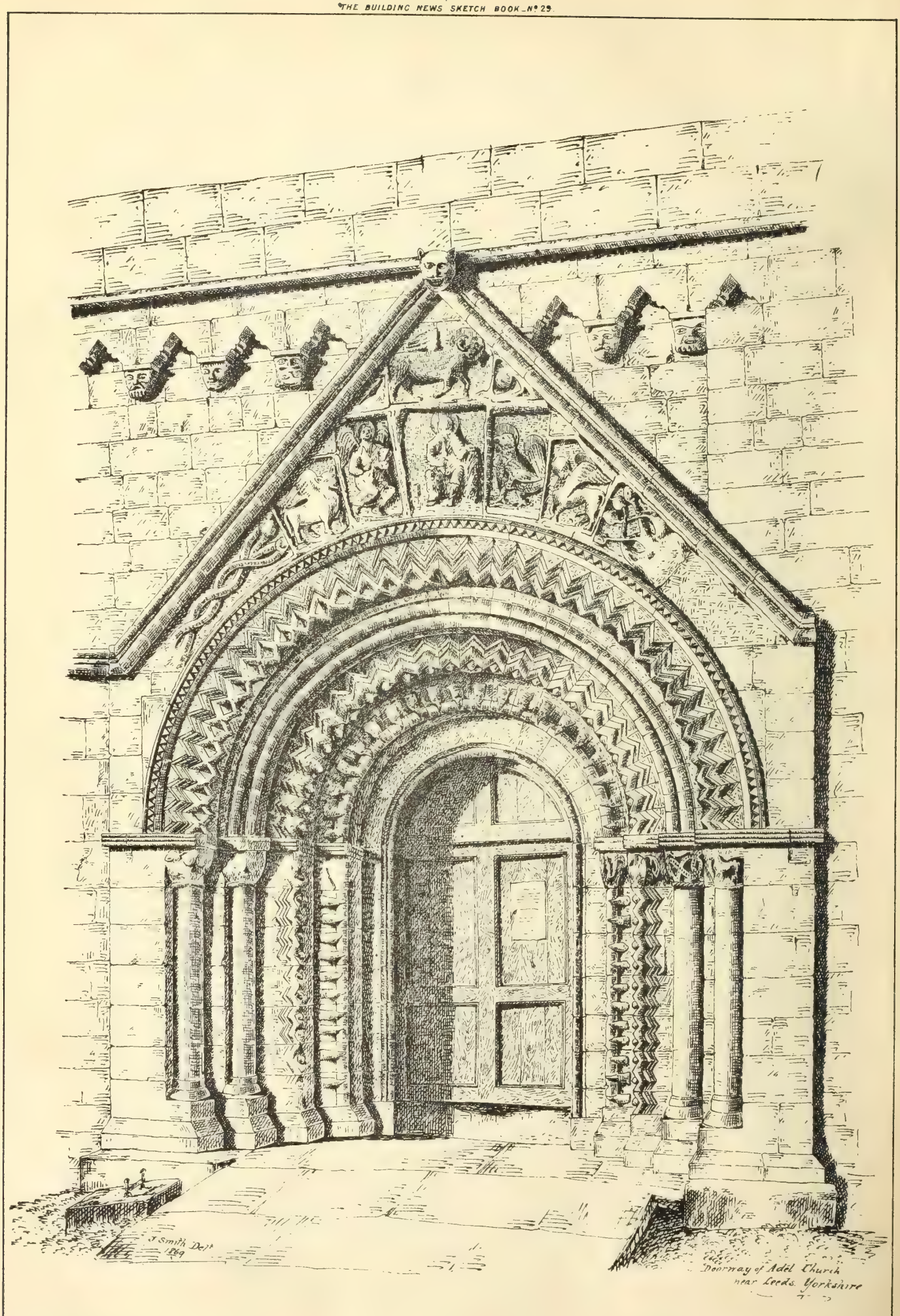
Whilst giving these studies we would observe that mischief often results through designing from nature without a thorough knowledge of the conventional principles employed by the old art masters, for ornamental design is a purely artificial result dependent on material and situation.

O. W. D.

THE INSTITUTION OF CIVIL ENGINEERS.

ON Saturday last, the 21st inst., a party of nearly fifty of the students of the Institution of Civil Engineers, under the guidance of Mr. Brunlees, Member of Council, visited by special invitation the cement works of Messrs. John Bazley, White and Brothers, at Swanscombe, Kent, for the purpose of receiving an explanation as to the process of the manufacture of Portland Cement. The invitation was given by Mr. G. F. White, now nearly one of the oldest associates, who was present at one of the recent weekly meetings of the students, when a paper was read by Mr. Preston, Stud. Inst. C.E., on the subject of the manufacture of cement. All the members of the firm were present to conduct their visitors over the manufactory, which stands on the banks of the Thames, and covers an area of fifty acres. The mixing of the chalk and the clay, in the proportions of three parts of the former to one of the latter, takes place in a series of double circular mills, about 12ft. in diameter and 3ft. deep, touching one another, and each furnished with revolving harrows to secure the perfect reduction of the particles. The chalk is delivered in lumps into one of these mills, which is kept constantly supplied with water, and the liquid passes thence to the other mill, where it receives the clay. After remaining long enough under the harrows, the mixture is pumped up to a height of some feet, whence it flows by gravitation through wooden spouts into large reservoirs called "backs," where it lies until drainage and evaporation have disposed of the greater part of the water. While the liquid cement is in the "backs," samples of it are constantly taken and burnt ; so that any defect in the proportions is at once detected and remedied. The residue is then transported, first to the drying stoves, and then to the kilns where it is to be burnt. These are constructed on the endless principle, and are bell-shaped. They are about 30ft. high, and are fed near the top with alternate layers of cement and gas coke. As combustion goes on the clinker is drawn periodically from the bottom of the kiln, and, after the rejection of any that is insufficiently burnt, it passes to the mills for grinding. Special care is taken to do this thoroughly, as the strength of cement is found to be greatly enhanced by fineness of grinding. A visit was paid to the testing-room, where samples of the manufactured cement are made hourly through the day. Some of these were selected by Mr. Brunlees, and the strain required for breaking them ascertained by the machine. The Messrs. White explained that the heavier cements, produced by excessive burning, were slow in setting, although ultimately acquiring a higher tensile strength than the lighter cements ; but they expressed their opinion that the quality of cement that would insure undoubted stability without increasing its cost by the diminution in volume that is inseparable from a very high specific gravity was the best suited for the general purposes of construction. When the inspection was concluded the students were entertained at lunch by the Messrs. White, who explained that they would be ready on all occasions to contribute in every way to the furtherance of the technical education of the younger members of the profession.

SOUTH KENSINGTON MUSEUM.—To provide space for the examination and exhibition of the national competition drawings of the Schools of Art in the United Kingdom, the gallery of Raphael's cartoons will be used, and must be closed for a short time.



John Smith Del.

Photo Lithographed by Whiteman & Bass, London

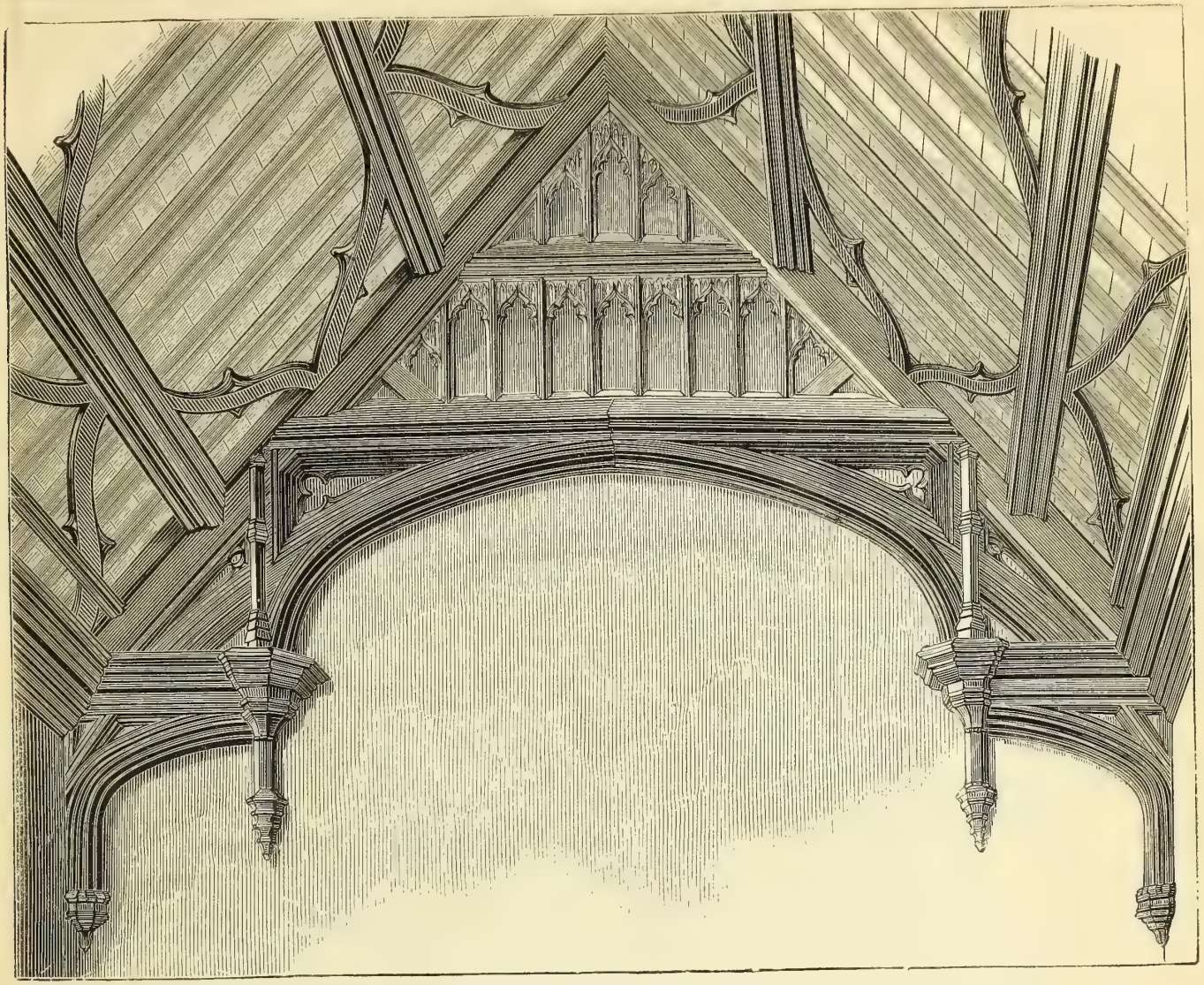
Doorway of Adel Church, Yorkshire.



SUGGESTIONS FROM NATURE DRAWN BY OWEN W DAVIS

Owen W Davis, del et lith

Printed by Whiteman & Bass



Roof of the Hall, Eltham, Kent.

BRIEF CHAPTERS ON BRITISH CARPENTRY.

By Thomas Morris.

(*Continued from page* 380).

IN an endeavour to approach the localities, dates, and destinations of these examples and memorials, occasional glances at the persons connected with their origin and course, as well as the habits of their time, are almost inevitable. We gather information at once as to where, when, by whom, and for what purpose a building was erected, with its precise configuration and principles of construction. Some of these may be held subordinate, and to be valued only for the light they cast, as by reflection, on the general subject; but none can be utterly ignored. Inference is a chief support of architectural history.

Eltham, anciently Ealdham (the old mansion or dwelling, as Lysons explains), is situated about eight miles from London, on the Maidstone road. It was a royal manor held by one Alwold under Edward the Confessor. William the Conqueror gave it to his half-brother, Odo, upon whom he also conferred the title of Earl of Kent, previously borne by Godwin, the father of Harold. When Odo was banished in the next reign, about four years after Doomsday Book had been compiled, it reverted with his other possessions to the Crown. Henry III. kept Christmas here with great state in 1270. The manor was afterwards divided by Edward I. There were three parks—namely, the Great Park, of 596 acres; the Little or Middle Park, of 333 acres; and Horne or Lee Park, of 336 acres. One consequence of this division is a somewhat confused history of the place; but it seems probable that one part was always in the Crown, notwithstanding the tenure of a portion by Baron Mandeville and another by John de Vesci. It was with the De Vesci property that the celebrated Anthony de Bek, Bishop of Durham, became connected. Bek was not a great churchman only, but a distinguished warrior, in which latter capacity he led the van of the king's army into Scotland, where in the course of the campaign De Vesci fell, and in dying made the bishop trustee of his estates. Bek sold Alnwick Castle to Henry de Percy, and retained Eltham, which he converted into a favourite residence, and died there in 1311. The splendour of his establishments were inferior to the king's alone. He maintained 140 knights, and had fair claims to be termed munificent. He founded colleges at Chester and Lanchester, erected towers at Gainford and Coniscliff, castles of Auckland in Durham, and Somerton in Lincolnshire, and Durham-place in London. From Bek the palace passed to Queen Isabella, and here her son Prince John was born in 1315. Edward III. twice held Parliaments at this palace, and gave a sumptuous entertainment to King John of France. A royal banquet was given by Richard II. to the exiled King of Armenia. Eltham seems, in short, to have been in favour with its regal owners till Henry VIII. gave preference to Greenwich. Elizabeth spent a few days here in 1559, and James I. made the last kingly visit to the place in 1612. The churchwardens "Paid for ryngers when the kynge's magestie came to lie at Ealthom, 12d." Frederick Prince of Wales was created Earl of Eltham in 1726. During the Commonwealth, the palace, already unfurnished and out of repair, was valued at £2753, clear of the cost of taking down, and sold; but the hall escaped demolition through its fitness for a barn, and to that purpose it was long applied. The sales of royal property were annulled at the Restoration, and Eltham was regained by the crown, to which estate it still appertains.

The Perpendicular style of Gothic architecture (to which the present example belongs) flourished under some of the most extravagant possessors of the English throne. It commenced with Richard II., and was in full vigour under Edward IV. The treatment of stonework had become elaborate, refined, and elegant; and it was by no means unnatural that the masons, by whom so great a result had been promoted, should in times of general parade be tinctured with prevailing arrogance. Their correspondence with the Continent, and probable, if not necessary, infusion into their ranks of foreign recruits—above all, their pretension to mysticism and secresy—must have been obnoxious amid the political conditions bequeathed by Henry V., together with his crown, bringing masons, as it were, within the bane of

> "Conjurors and sorcerers, that, afraid of him,
> By magic verses have contrived his end."

Their lodges, or confederacies, were accordingly prohibited by an Act, 3rd Hen. VI. (1425). But we may perceive an indication here that the most advanced phases of the building arts had become sufficiently naturalised to be independent of extraneous support; and that carpentry, placed upon a footing of

unprecedented eminence by the masterpiece of Westminster Hall, had obtained a high artistic recognition. It must have been felt that a period had arrived at which architecture could be released from thraldom to a craft, made free of every material, and instead of being the slave of one, become the equal patroness of all. The most elaborate and intricate examples of masonry were executed after the holding of lodges had been made culpable; but the presence of timber had become agreeable where stone at an earlier date would have been deemed indispensable. Stone vaulting, as seen not solely in great ecclesiastical monuments, but in the occasional embellishment of secular works—take as instances the ceilings of bays and oriels—is thoroughly beautiful (those at Eltham fully bear this out, save that one has been sadly injured to allow the passage of waggons). But this sensation is largely dependent both on fineness of detail and the upturned direction of the eye. Plain vaulting at a small height is cold, depressing, and cheerless, but becomes airy and pleasing at a great elevation.

The hall is on a very perfect plan, and of fine proportion, being in length 101ft., in width 36ft. 3in., and in height about 55ft. The length is relieved by the recessed bays or severies at the west, and the screen and gallery at the east. There are five other bays on each side, separated externally by buttresses. In every bay is a pair of two-light windows, connected by the hoodmould or label being carried horizontally across the dividing pier at the springing. The double cusped tracery of their heads is exceedingly elegant. The windows are raised above a string moulding, as at Westminster and Croydon—a circumstance not observable in some early examples, but one that was calculated to give repose and dignity to the interior, as well as to display the heraldic charges with effect. The walls are of Kentish rag below the windows, and of Ryegate ashlar above.

For the roof, the length is also divided into six parts, with seven principal ribs, resting on stone corbels, bonded into the masonry. There is some assimilation of design to the roof at Westminster, but an immense inferiority in sustaining power and equilibration. The flattened arch is not only essentially weaker in form, throwing an augmented stress upon the upper part of the walls, but here it does not assume the actual office of a chief bearer, so much as apparently that of a preserver of normal conditions. Homage was done to the figure of the arch as a constructive accompaniment, when it was no longer regarded as a practical necessity. It is, in fact, the artistic line by which a series of separate and immaterial struts are governed and connected. The arch being cut into parts, while the members that cross it, though secondary features of the design, are entire, it imparts complexity and richness, but is of no essential utility. The hall generally has been admirably represented, and the framing of the roof most carefully dissected and illustrated, by Messrs. Dunnage and Lavers, so that with all the details so openly revealed, the architect can readily trace the intentions of the mediæval craftsmen.

The side walls are not raised very much above the heads of the windows, and the timber work commences with a plate 12in. by 18, in two parts each 9in. thick. Caulked down and pinned upon these plates are beams 16in. by 12, projecting inwards 6ft. 9in. Upright posts rise from the stone corbels already spoken of. To these projecting beams and framed into both are curved pieces, forming an elliptic quadrant or half arch, to serve as a bracket. To the inner end of this short beam is framed the queen post. From the wall end of the same beam rises the principal rafter. Midway up these principals occurs the usual horizontal beam, and this is prevented from sagging by a four-centred arch springing from the brackets. The mode in which the horizontal beams are framed into the principals shows that they were regarded as struts, and not as ties. But it is obvious that a strong timber, securely framed into others at its ends, is equally suited to resist extension and compression. A piece intended as a strut may consequently, under some change of structure, serve the purpose of a tie, and this reverse of purpose has no doubt often taken place in old roofs. The errors of contrivance may be counteracted by the inherent strength of large frames of woodwork based on no very direct agreement with the laws of stress. Whenever it is found that pins and tenons have given way, it may be suspected that some unlooked-for power has been exerted, as pins and tenons could never have been rightly applied, if tension were presupposed. It is difficult to describe a roof so deficient in simple perspicuous principle as this of Eltham—a defect that time has severely exposed. The trusses are said to contain a larger proportionate quantity of material than those of Westminster. Yet, with its constructive demerits admitted in full, there are few examples with more of elegance to disarm criticism and invite admiration. The original beauty of the pendents has been much impared by the loss of the small pinnacles and perforated panels with which the central posts were encased, but a record of their design has been preserved, and they are not the less interesting from similarity to the later work at Christ Church College, Oxford. The workmanship of the entire roof is admirable, and the timber of remarkably clean and superior quality. The scantlings are so free from sap and knots that Messrs. Dunnage and Lavers concluded that they must have been cut from oak logs of great size; but such qualities agree so closely with those of chestnut discussed in the last chapter, that I should be disposed, upon the evidence before me, to assign it to that species. Pugin remarks that of those who examined the material during certain repairs, some deemed it of one kind, some of the other. It is quite possible that woods so alike in their properties and appearance may have been jointly employed or introduced without distinction in repairs. Foreign oak is often of straighter and finer grain than our "unwedgable and gnarled" variety. Chestnut has a whiter sap and browner heart, and the pores of the alburnum (which, in oak, are open and frequent), are so minute as to be hardly observable without glasses. (Sir H. Davy, "Agric. Chem.") Belidor says it soon rots when built into a wall, and that the ends of joists should therefore be left free, and it is observable that the ends of the principals at Eltham were most affected by decay, though this may have been accelerated by the imperfect condition of the gutters. With the information now at command on the subject, a moderate power of discrimination ought to suffice for setting the question at rest.

Another point has been mooted touching the fastenings employed, and the fact seems to be that in the skeleton framing wooden pins were exclusively employed, but iron nails were used for attaching to the main timbers the mouldings which had been separately wrought. The forging of nails that now forms a gigantic branch of industry, and has no doubt exerted a considerable influence on the system of carpentry, was but little followed, except for special purposes, in this country, and those used at Eltham were probably foreign. "Among the list of articles the importation of which was prohibited in Edward IV.'s reign, with a view to the protection of domestic manufactures, we find no mention of iron, which was still, as a matter of necessity, allowed to come freely from abroad." (Smiles' "Indust. Biog.")

The badges of Edward IV. among the ornaments, the general character, and known events, serve to connect this erection with his reign. His residence here in 1480 is marked by the birth of Princess Bridget, who became a nun at Dartmouth, and the festive celebration of Christmas, 1483,* when 2000 persons were daily entertained, may have been intended also to commemorate the recent completion of this stately and sumptuous apartment.

ON THE PROGRESS OF ART, AND THE PROBABLE CAUSES OF THE GREEKS' PRE-EMINENCE IN ITS PRODUCTION.

BY H. C. SELOUS.

(*Continued from page* 381.)

THE primitive inhabitants of Greece appear to have been a people called Pelasgians, afterwards amalgamated with or conquered by the Hellenic race, and known to us by the more general name of Greeks. The real origin of the people is lost in obscurity, though there is little doubt that, like most European races, they came originally from Asia. On investigating the oldest reliable art records we have of the race now under consideration—those remarkable Greek vases that we have been in the habit of miscalling Etruscan—we find in them undoubted testimony of a variety of their customs, dresses, and employments long anterior to those found in any other specimens of their art. The earliest of these vases dates back more than 2500 years ago, and we are indebted for the preservation and possession of these remarkable works of art to the mode of their disposing of their dead, as most of these fictile records were found in tombs. In studying these important vestiges of a bygone age, we feel sure that the artist copied as faithfully as he could what was before him, particularly with regard to costume, and we know that the gods of all nations at the commencement of their art are always invested by the artist in the costume prevalent in his time. We find that the rule holds good in these Greek delineations. Gods and goddesses are habited precisely as the mortals are, but one curious fact is shown in the costume of this ancient race that exhibits a marked difference from other primitive nations. I allude to the invariably complete and fully-clothed figure of the female, and the utter absence of drapery or what may be called body-clothing on the figure of the male. It may be said that that is probably the artistic rendering of the subject, and no doubt, as the nation advanced in civilisation, in some respects it became so, but that this was not the case in their earlier history is shown by other evidence. In the first representations of their wars their armour (which appears to have been made of leather) is nothing more than a jacket without sleeves, worn over the naked body, and descending no further than the hips. They have a towering crested helmet on their heads, and the leg is protected by the greave, also of leather. But the rest of the body and limbs is perfectly unprotected, and in their delineations of their heroes of later date the same form is retained, though the minutiæ and the details of the armour (now of metal) are entered into most fully; but the dress, as far as all purposes of covering are concerned, ends really at the waist. There are numberless other instances that could be advanced to show that the early Greek scarcely ever encumbered himself with drapery, and when he did so it was a cloak or mantle of most simple description. These singular peculiarities of the race prove three things:—First, that they must have attained a greater knowledge of the formation of the figure than any preceding nation; second, that the male form in its pure state suggested no ideas to their minds of impropriety; and third, that it created a reverential feeling—a feeling till then unknown to other nations—and taught them in the perfect figure of man alone to find the fitting form to embody even those of their gods. Principally from this cause sprang all their after-power in art. From Phœnicia, it would appear, and from some tribes of Northern Asia, civilisation advanced into Greece; the rudiments of art soon followed from the same sources. There is a collection of small terra-cottas of undoubted Phœnician work, which are similar in type to the statues from Branchidea, in the Lycian Room at the British Museum, and which are, I believe, the earliest specimens we have of Greek art, and they bear unmistakeable evidence of Asiatic origin; and the earliest examples we have of Greek pottery have their prototypes in Phœnician earthenware. Art, once planted in the genial soil of Greece, took vigorous

* This date, followed from Pugin's "Examples of Gothic Architecture," appears to require correction.—T. M.

root and advanced with rapid strides, and in the drawings and designs displayed upon their vases you see the germ of those strict rules of Classic art laid down to which the future great sculptures were very greatly indebted for their excellence; and from almost the first examples shown on these extraordinary ceramic specimens up to the perfecting of sculpture in the time of Pericles, you will find the same rule adhered to—an absence of drapery on the male and the complete clothing of the female figure. I am not aware of any example in Greek sculpture of even a partially dressed female up to and inclusive of the time of Phidias. They appeared intuitively to feel the falsehood of the opinion expressed in the line of one of our own poets—

Beauty unadorned adorned the most.

They knew that to divest the beauteous form of concealment destroyed two of its greatest natural charms, its modesty and its mystery. Possessed, then, as the Greeks were, of these refined feelings of what is truth in beauty, and with already a thorough knowledge of the human figure, we see for the first time in the history of the world, even in their baby efforts and attempts at art, before they were out of their cradle as a nation, a perception—an inspiration, if you will—of what is the real cause of pre-eminence in art. It was the constant study of the human figure, as containing within its structure and its varied motions every element of grace, beauty, and perfection. They were the first to perceive its power. They saw, they revered, they adorned. Unlike any other nation before or since, we may almost say their art produced their religion—the falsest, perhaps, but surely the fairest that had yet appeared on earth. With other countries it is usually the reverse—their religion has produced their art. All the phases of man's existence have been pourtrayed by them with inimitable skill, tender age (as shown in their Cupid, their Bacchus, and their Psyche); perfection of loveliness and beauty, as shown in their Venus, Diana, Mercury, Hebe, and Apollo; strength, as depicted with vigorous power in their Hercules, Theseus, Neptune, Mars, and a host of others; impersonations in the full prime of manhood; the maternal charms of a Juno, a Ceres, and a Niobe; and the virgin purity and stateliness of a Minerva, till the mighty efforts of their power culminated in the production of the masterpiece of the immortal Phidias, the greatest sculptor the world ever—the Shakespeare of his art—his last and greatest effort produced that most sublime work, the Olympian Jupiter, pronounced by all the wonder of the world. This noble and matchless work of art, a seated figure, the flesh of ivory and the vest of gold, was 60ft. in height, and reared its majestic head even to the summit of the temple formed to receive it. The grateful people, the Elis, for whom this statue was made, passed an edict, as the greatest honour they could bestow, that the descendants of the great sculptor should be the guardians of this statue for ever. Would that their intentions could have been realised! And here let me impress upon you that in the production of these irreproachable works there was no waste of the artist's time and genius, no frittering away of the mind on undue finish of detail or accessories, which, instead of adding to, would have detracted from the surpassing grandeur of these great creations. Writers of the present day, when speaking of art and art-producers, are too apt, in my humble opinion, to indulge in what I will venture to call too poetical a style in their criticisms of detail and elaboration in art. Led away by the consciousness of their own talent, their mastery over language, or their accomplishments as Classical scholars, joined to, no doubt, a great love of art, they are too prone to indulge in magnificent word-painting, and to so overwhelm and smother, as it were, with roses the subject of which they propose to treat, that it is in great danger of being lost sight of altogether. They exhaust the powers of language, and go into ecstatic descriptions on the painting of a daisy or the carving of a leaf in stone; they try to invest, by the power of their art, the most trivial, common-place occurrences of every-day life with undeserved interest, striving to give a false sentiment to things that in their nature have it not. Nothing, in short, is too mean or too simple in art to escape poetic description. The higher claims of art receive no greater eulogies—or, indeed, are very often unattended to. This is not truthful, and doubtless in the future the false taste will be discovered. Our poets, some of them of acknowledged power and original genius, have been led away by the same error, and, aiming at excess of simplicity, have, I grieve to say it, at times almost descended into childishness, and their verse has bordered upon nursery rhyme—or else, on the other hand, they have soared so high into the realms of symbolical and mystic nonsense that they are unintelligible. Our painting, as a grand art, advances not, while our painters, men possessing the greatest talent, have been employed in vain endeavours to give interest to ugliness, and poetry to false perspective; and sculpture is degraded in aiming to represent Chantilly veils, books in stone, or rush-bottomed chairs. This false poetical medium, through which the subordinates of art are endeavoured to be shown, is, I fear, greatly detrimental to the art student. He, after reading some of these glowing treatises, is quite bewildered, though not instructed, by the indiscriminate praise, and fancies that he too will become a painter, and finding that the trifling subjects and trifling objects which call forth such high encomiums are easier to paint and require less laborious study than that absolutely necessary to gain a knowledge of the human figure, and the power of delineating human passions—the power that is so essential to the production of a great artist—he is content, therefore, to paint chairs and tables, priests' vestments, and satin skirts, and gain some portion of that praise that is so lavishly bestowed upon such an every-day description of subjects. Half the pictures, too, that are now painted trust to their titles for their poetry and their interest. If they were to lose their descriptions many of them would present a blank to the spectator's mind. This false endeavour to create interest in a picture or a statue that, as a work of art, has none, will not tend to produce great painters, great sculptors, or a discerning public. Still, amidst the deepest regrets for the recent loss of one of our greatest champions of art, Daniel Maclise, who has fought the good fight, let us hope, when we see such works as Goodall's "Ishabod," Millais's "Knight Errant," and Dicksee's "Lady Macbeth," that grand art may at length be roused from her almost death-like sleep of ages. Grand imaginative works of mind, created by the pencil of the painter and the noble thoughts of the sculptor, realised by his strong right hand from their stony prison, were the fit subjects to call forth the energies and the poetic powers. A poet is not necessarily a painter or a sculptor, but he that is really a great artist must of necessity be a poet to feel the sublimity, and to approach with reverence and study with respect Nature in her grandest aspects—in the infinite variety and exquisite flow of outline displayed in the ever-varying motion of the majestic form of man, and in the study of his ever-changing passions. Or let him go forth and watch the smiling landscape, lit up in magic colour by the glory of the passing sunbeam; or trace the progress of the coming storm, moving in gloomy majesty over the valleys, wrapping in fantastic forms of writhing vapour the mighty rocks that echo back its muttered thunders. This is the poetry of the Great Creator of all nature, whose ever-varying aspects give lessons that cannot be surpassed. Who can paint the rainbow or the glittering sun? And in the living figure there are perfections that will vie with those displayed in the statues of the Fates and of the Theseus, and which would tax the powers of a Phidias to reproduce.

(To be continued.)

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE usual fortnightly meeting of the Institute was held on Monday evening the 16th inst. Mr. T. H. Wyatt, president, in the chair. The chairman and Mr. Charles Barry gave some particulars of the deputation that waited upon Her Majesty's ministers recently, with respect to the dispute between Mr. E. M. Barry and Mr. Ayrton. The usual routine business having been gone through,

Mr. Arthur Hill, B.E. (Associate), read a paper

On Some Ancient Irish Churches.

The Author commenced with a quotation from J. H. Parker *—"The study of Irish architecture is only commenced, and will require the labour of many heads and hands to work it out as it ought to be"—and went on to state that the conquest of Ireland, which took place in the year 1172, separated her architectural history into two great divisions—firstly, the buildings of the native Irish, secondly, Anglo-Irish building. The former affords the only existing remains of a purely Celtic style in the world, and is as interesting as any of the minor styles of Europe; the latter so plainly shows its English origin that it has no claim to be considered a distinct style. The works contained in this group are of all kinds, ecclesiastical and domestic, and are not only inferior in size, but, generally speaking, later in date than buildings of the same character in England.

Of the many works that come under the head of "native building," there are but four classes of structures professionally interesting — namely, the Round Towers, the Crosses, the small stone-roofed buildings known as "Oratories," and the churches, that are called in Irish *Daimliag*, which literally means "stone house." The erection of these works may have continued later than the Conquest, at least in those parts of the country that remained more peculiarly Irish, while the Anglo-Irish style could by no possibility be earlier than that time. These later works are generally so well authenticated that there is no room for disputation as to dates, but unfortunately it is not so with regard to the primitive Irish works. It appears that the first colonists of Ireland were a family of the Phœnician or Cuthite race—descendants of Ham; a people celebrated for their building powers. Their successors, the Celts, who established themselves in Ireland some centuries before the Christian era, were civilised and taught the arts by this race whom they had conquered. Mr. Marcus Keane, in his recent work on "The Towers and Temples of Ireland," attempts to prove that the buildings we call "churches" were originally heathen temples, erected by the Cuthites before the time of Solomon, and to sustain this position endeavours to draw a parallel between them and the Cyclopean buildings of Greece and Italy, the rock-cut temples of India, and the ancient monuments of Central America; but a professional observer, judging even from drawings or photographs, would ascribe nothing but a Christian origin to the buildings. Dr. Petrie, in his learned work on "The Ecclesiastical Architecture of Ireland anterior to the Anglo-Norman Invasion" established these amongst other important principles—that the round towers and adjacent churches are contemporary, Christian, and ecclesiastical, and that they were erected at different periods, from the seventh to the thirteenth centuries. He proves beyond doubt, from the ancient MSS. of the country, that there was stone building of some kind in Ireland at a very early period of the Christian era. The school that finds most favour on this side the channel contends that there was no stone building in Ireland of any kind before the eleventh century, but this is far too sweeping to be accepted.

Mr. Hill, after some further remarks of an archæological character, proceeded to describe the three following buildings, measured drawings of which, executed by himself, illustrated his remarks:—The Cathedral of Ardfert (which belongs to the Anglo-Irish class) and Templenahoe and Kil-Melcheder (Celtic works, known as "stone churches.") These buildings are all situated in the county of Kerry. As there were constant references made to the drawings it would be impossible, with the limited space at our demand, to give an intelligible abstract of the paper. Suffice it to say that the paper was an extremely interesting one, and was warmly commended by Mr. Burges, Mr. White, Professor Kerr, the chairman, and other gentlemen who took part in the discussion.

Mr. E. W. Tarn (Associate) then read a paper "On the Measurement of Skylight in cases of Obstruction of Light." We are unable to give this at present, but hope to do so shortly. A mathematical discussion followed, and the meeting adjourned.

* *Gentleman's Magazine*, March, 1865, p. 285.

THE EDINBURGH IMPROVEMENT TRUST AND SANITARY RULES.

THE Edinburgh Improvement Trust is a body connected, we believe, with the corporation, having for its object the improvement of the not over-cleanly town in which it exists. Some building lots recently offered for sale by the Trust have gone a good while begging, the Edinburgh builders refusing to buy on account of two of the conditions of sale. These were that no public-house should be erected on the property, and that all water-closets should be ventilated from the outside, instead of by shafts. The

sanitary zeal of the trustees, which led to the insertion of the latter clause, is not proof against "no returns," and so it has been determined to withdraw it. The logic of the Lord Provost was irresistible. "Why not, said he, "sell the property as you would sell stinking fish?" Most opposite of metaphors! The property *is* to be sold "as you would sell stinking fish." By-and-bye the public-house clause will follow its brother, and then the "Improvement" Trust will be in the very curious position of a body which came into existence for the improvement of the town, and yet was compelled to surrender its two most important conditions of moral and physical improvement.

SANITARY REFORM IN BRISTOL.

MR. HENRY MOODY, of the Royal College of Physicians, read a paper at S. George's Hall, Langham-place, on Sunday the 8th inst., under the auspices of the Sunday Lecture Society, on "The Prevention of Infectious Diseases, illustrated by the Sanitary Measures enforced in the City of Bristol." The lecturer said that public health has well been termed public health, for every person lain aside by bad health represents so much wealth subtracted from the resources of the city in which he lives. While we were emancipating freeholders, and abolishing present taxation, the public health, a matter of supreme importance, was thoroughly neglected. Two or three epidemics, however, have subsequently raged so violently that imperial and municipal authorities have been fairly frightened into considering the conditions under which epidemics are propagated, and, as a result, measures have been enacted which have to some extent, though only partially, lessened the chances of disease. Since 1847, the succession of statutes passed attest the importance of the subject. Mr. Moody entered at some length into the statistics of zymotic or self-propagated diseases—which include small-pox, measles, scarlet fever, cholera, and diarrhœa—and said that from a return recently printed it appeared that from the years 1864 to 1868 inclusive, the average annual mortality from these diseases was over 111,000—nearly one-fourth of the total mortality from all causes. In these five years, and in the whole of the kingdom, fever destroyed 141,000; and scarlet fever, 120,700. It was not too much to say that for every death there were seven persons attacked by the malady. The spread of epidemic fever is greatly aided by over crowded houses and want of ventilation. Perhaps of all causes, this has most to do with the incubation and diffusion of such fevers as typhus, enteric, gastric, inflammatory, &c. Experience seem to show that by the diminution of the number of persons inhabiting a given space the vigour of such diseases is stayed; yet it is scarcely reasonable to eject a large family from an overcrowded tenement unless they have means of obtaining other and better shelter. Hence comes the most important question whether cheap trains could not be provided, which, by taking working-men to and fro daily, would enable them to live in a healthier state. The influence of water supply on the sanitary condition of a town was next touched upon, and Dr. Simon's report on the cholera epidemic of 1866 referred to and quoted from. The necessity of a constant service of good water being provided was, said Mr. Moody, recognised by all sanitarians worthy of the name, and to the very poorest classes such a supply would be an inestimable blessing. Though so much had been written and agitated on the subject, the conditions essential to the prevention of the spread of epidemics were rarely thoroughly fulfilled, and town after town might be named where they are but little attended to, or where scarcely rudimentary endeavours have been made to attain them. The ravages of cholera at long intervals is not Nature's only retribution for our neglect. Typhoid fever is a witness to such neglect. The mere quantity of the waste of life is horrible to contemplate, and with the knowledge that it is preventible is it nothing less than shameful and a disgrace to our boasted civilisation. Foul air, the greatest enemy to the public health, ranks foremost as slaying more men than all our battles and colliery and railway accidents. Modern sewers very often are as offensive as, or even more offensive than, the old cesspools and middens—bad, dirty, and unwholesome as they were. With an independent water-supply the latter would often be less injurious than sewers, as the chief harm resulting from cesspools and middens has been the percolation of organic matter into the well-springs supplying water. But sewers, for want of proper ventilation, are allowed to let their foul gases escape through gully-holes, sink pipes, and water-closets; thus the atmosphere is filled with noisome vapours, and disease is the necessary consequence. Yes, there is a large army of martyrs to apathy and municipal short-sightedness. The "germ theory" of disease was referred to, and Mr. Moody said that in view of the correctness of that theory, the more incumbent was it upon municipal and local authorities to make all their sanitary arrangements most thorough in character.

Coming to the more immediate subject of his lecture, Mr. Moody said that Bristol had been selected as an illustration, for there, above all other towns in the kingdom, has proof been given that, by man's attention to physical science, disease and premature death may be to a great extent averted. From being one of the most unhealthy, Bristol has become one of the most healthy of cities. To give some idea of this, it may be mentioned that in the summer and autumn of 1832, the ravages there by cholera were enormous—the deaths alone approaching to 1000. In 1866, on the contrary, when the poor at the East-end of London were dying by hundreds, the deaths in Bristol were but 26. This vast difference has arisen from the precautions and general sanitary measures adopted by the inhabitants and authorities of the city of Bristol. Nor is the improvement confined to cholera alone; it extends more or less to all infectious diseases. Sanitarians of an earlier day regarded plenty of water, light and air, and good food, as essential conditions, but the sanitarians of the present age recognise the existence and vitality of certain germs as the essential condition of the spread of diseases, and, these being absent, they attach far less importance to the others. It appears that in consequence of the cholera epidemic of 1849, the General Board of Health sent down an inspector (Dr. Clark) whose report describes a state of filth and neglect too horrible to be mentioned in any but general terms. After the appearance of this report the Local Board was instituted (in 1851), and gradually commenced the work of constructing an efficient system of sewers, which has since been carried on by Mr. Ashmead, the engineer to the Board. The old masonry drains have been removed, 60 miles of new drains have been constructed, and more than 500 miles of pipe connections have been laid. Some time before this a company was formed for supplying Bristol with water from the Mendip Hills, on the constant service system, and as the water was taken from a point far above any polluting influences, one frequent source of epidemics was shut out from operation. In 1864 there was an alarming outbreak of typhus fever in the city, and in the parish of S. Jude nearly every house became infected. In February, 1865, the Board of Health appointed Dr. Davies to the post of medical inspector, and he, with his staff of assistants, set to work right earnestly in improving the sanitary status of the town. In S. Jude's and the other localities where fever had its strongholds, it was found that the houses were small and overcrowded, situated in unpaved courts, and with, in some cases, only one closet to every court. Upon the unpaved and broken irregular ground excreta and other matter was continually thrown, which, being absorbed by the porous earth, in turn gave off noisome exhalations. Dr. Davies energetically set to work to improve this state of things. In the first place all the courts, to the number of 506, were paved with hard flagstones, and drains laid to the sewers. More closets were provided, and those that already existed were improved. The remainder of the old masonry drains were abolished, and the pumps in the various courts were completely closed. The city and its environs, corresponding with the Parliamentary borough, were next divided into four districts, and an inspector and two labourers appointed to each. By the work of this staff every court was to be whitewashed once a year, and visited three times a week, in order to see that the closets and pavements were properly flushed, and that no offensive matters were allowed to accumulate. The men of the sanitary staff were instructed to cultivate friendly relations with the people of their districts, and to obtain early information of the outbreak of epidemics. The reports of the four inspectors were submitted to the medical officer daily, and the latter, on receiving information of an outbreak, at once visited the spot and saw that such means of disinfection, &c. as he considered necessary were carried out. The patient was as much as possible isolated from the uninfected, and in the event of death or recovery, the bedding, &c., was seized and burned by the officers, and replaced at the cost of the Board of Health. It is gratifying to know that these precautions soon diminished the death-rate considerably, and with the continuance of this wholesome *régime*, more or less modified, Bristol has, as already stated, become one of the most healthy of cities, and thanks to Dr. Davies, the Medical Officer of Health, has had no serious outbreak of epidemic disease since his appointment. Every case is hunted down, and its seeds stamped out. It was incidentally stated that the sewage of Bristol is not yet utilised, but that as a temporary summer measure, Dr. Davies caused carbolic acid to dribble into the sewers from casks suspended in the manholes, so as to remove the stench formerly existing at the outfall. It was also mentioned that the disease which now serves to keep up the Bristol death-rate, and to keep the city within reach of its rivals, is bronchitis. Mr. Davies attributes this, in great measure, to the loading of the air with smoke.

PARLIAMENTARY NOTES.

THE NEW NATIONAL GALLERY.—Mr. Beresford Hope, on Friday last, after dwelling at some length upon the want of accommodation for the collection of pictures at the National Gallery, the unsuitableness of that building for the purpose to which it is applied, and the necessity for proceeding without further delay to the erection of a new gallery, moved for the production of correspondence between the department of Public Works and the architect of the National Gallery on the subject.—Mr. Ayrton, who had no objection to produce the papers, explained that the Chief Commissioner of Works had no authority to enter upon any great undertaking of this sort, but could only carry out the instructions which he received from the Government. He added, however, that having regard to the imperative demands upon the Exchequer for the construction of other buildings, which were necessary for the effective administration of public affairs, and the relative claims of one to be erected before another, ministers would give the matter their best consideration, and as soon as they felt they could embark in such a work they would be prepared to submit a proposal on the subject. Meanwhile he contended that the walls of the National Gallery were not overcrowded, that too large a space was monopolised by the works of one master, Turner, and that the lower story might be "cleared out," and to a certain extent appropriated to the exhibition of paintings.—In the course of the discussion which followed, Mr. T. Baring pronounced a severe censure on the manner in which the Chief Commissioner of Works treated the trustees of the National Gallery, whom he never deigned to consult, and to whom, as a rule, he accorded scant courtesy. He gathered, from what that right hon. gentleman stated, that the Government did not intend that there should be a new National Gallery.—This, Mr. Gladstone assured Mr. Baring, was a mistake, but that the great works at the Post Office, the Kensington Museum, the Home and Colonial Offices, and the buildings for the Admiralty and the War Department were of greater urgency. The discussion terminated with the withdrawal of the motion.

THE INSTITUTION OF CIVIL ENGINEERS.

At the last business meeting of the members of this Society for the Session 1869-70, which was held on Tuesday, the 24th inst., Mr. Charles B. Vignoles, F.R.S., President, in the Chair, twenty-four candidates were balloted for, and declared to be duly elected, including seven Members, viz.: Mr. John Bower, Dublin; Mr. George Buchanan, Westminster; Mr. Willian Janvrin Du Port, late Chief Engineer of the Victoria Dock Company, Singapore; Mr. James Barry Farrell, Wexford; Mr. John Hill, Ennis; Mr. Carl Siemens, Westminster; and Mr. Robert Tyndall, Executive Engineer, P.W.D., India. Seventeen gentlemen were elected Associates, viz.: Mr. John Collier, Salters' Hall; Mr. Frederick Colyer, Leman-street; Mr. Joseph Samuel Forbes, Engineer of the Trent and Mersey Navigation, Shelton; Mr. John Lawton Haddan, Engineer-in-Chief for Syria and the Lebanon; Mr. Charles Hall, Engineering Staff of the P. and O. Steam Navigation Company, Southampton; Mr. Arthur Samuel Hamand, Birmingham; Mr. Alfred Chalmers Lawford, Executive Engineer, P.W.D., India; Mr. Matthie Charles Mackinnon, Adelphi; Mr. Edward Manisty, Dundalk and Greenore Railway Pier and Harbour Works; Mr. Charles Robert Manners, Inverness; Mr. Angus Nicolson, Skipton Castle, Yorkshire, Mr. Robert Pitt, Newark Foundry, Bath; Mr. John Rotheroe, King William-street; Mr. Charles Edward Shepherd, Lieut. B.S.C., Executive Engineer, P.W.D., India; Mr. William Stroudley, Locomotive Superintendent of the London, Brighton, and South Coast Railway; Mr. Henry Hay Wake, Sunderland; and Mr. Richard Harris Williams, St. Austell.

A report was brought up from the Council stating that

under the provisions of Section IV. of the Bye-Laws, the following candidates had been admitted Students of the Institution since the last announcement:—Messrs. H. E. R. Hoggar, F. J. Holding, and H. J. Pratt.

During the Session just concluded, there have been added to the Register of the Institution 42 Members, and 114 Associates, while the Council have admitted 56 Students. The numbers of the several classes now on the books are 16 Honorary Members, 703 Members, 1002 Associates, and 178 Students, or a total of 1899 of all classes, as against 1758 at the same date last year, or an increase in the interval of upwards of 8 per cent.

OBITUARY.

DEATH OF MR. D. O. HILL.—The death of Mr. D. O. Hill, the distinguished landscape painter, is announced. Mr. Hill's name will ever be associated with the cause of the progress of art in Scotland, for it is in no small degree owing to his unwearied exertions that the Scottish Academy holds the high position which it has attained. For many years the deceased held the situation of Secretary to the Council of the Academy, from which useful office he retired sometime back.

Building Intelligence.

CHURCHES AND CHAPELS.

BURLEY.—Burley Church is situated upon a hill about two miles north-east from Oakham. The church, which is dedicated to the Holy Cross, is a stone building, and has lately been restored by the Hon. G. H. Finch, Esq., M.P., at a cost of £3000, in memory of his wife, Emily Eglentine Finch. The architect for the restoration was Mr. Pearson, of London, and the builders Messrs. Haliday and Cave, of Oakham. The church contains three stained glass windows, and is seated throughout with open oak seats. The pulpit and chancel are of carved oak, and the whole of the floor in the chancel is paved with marble quarries surrounded by encaustic tiles.

CLANFIELD.—On Tuesday week the parish church of S. Stephen, Clanfield, Oxon, was re-opened, after restoration. With the exception of the plain square tower, every portion of the church has been rebuilt, the opportunity being taken to enlarge it considerably. The architect is Mr. J. Luker, of Southend, whose designs have been carried on by Mr. Edward Smith, of Highworth, and Mr. Henry John Clinch, of Charlton-on-Otmoor, the last-named having undertaken the chancel. The walls have been built of Brize-Norton stone, with freestone dressings. In the nave the wall stones have been faced and pointed; but in the chancel they are simply picked out and and pointed. In all cases the old materials have been supplemented by stone of the same description. The chancel arch is nearly double the span of the old one. The north aisle has been reduced and deepened, so as to afford additional area in the nave. An old gallery formerly obstructed the west end. This has been removed and the tower thrown open to the church.

LEICESTER.—The foundation stones of two new churches, dedicated respectively to SS. Paul and Mark, were laid by the Bishop of Peterborough on Wednesday week. The church of S. Paul is to be built in the most substantial and elegant manner, divested of as much extraneous ornament as is possible and consistent with the application of the materials of which it is to be composed namely, Mountsorrel granite, bounded and interlaid with the Derbyshire red grit stones covered with the Swithland gray green slating:—Tower: 21ft. square (62ft. high for the present), additional height required for belfry and spire 128ft., making the total height nearly 200ft.—Nave: 91ft. long by 31ft. 4in. wide, 38ft. 3in. high to eaves of roof, 60ft. high to ridge.—Aisles: 83ft. 6in. by 17ft., 13ft. 10in. high to eaves, 28ft. high to ridge.—Chancel: 43ft. by 29ft. 2in., 36ft. high to eaves.—Vestry: 18ft. by 14ft. by 12ft. high. Messrs. Osborne have undertaken the execution of the work, at a sum under £5000. The publicity of the circumstances induced the committee to select this design from a general local competition. The design submitted by Mr. F. W. Ordish, of Queniborough, was selected, with whom is now associated Mr. J. C. Tayler, engaged with him in practically developing the work. S. Mark's has been designed to fit a site of very irregular form. In plan it consists of nave and chancel of equal width throughout, the latter terminating in a semi-circular apse; north aisle of parallel width, with vestry at the eastern end; south aisle in three bays each projecting beyond the other further south, to meet the inclined line of street boundary. The tower is at the eastern end of the south aisle, and between it and the chancel will be an organ chamber. The length of the nave is 62ft., its width 31ft. and its height to the point of the arched ceiling 53ft. The chancel is of similar width and equal height, and is 37ft. 6in. deep to the centre of the apse. The north aisle is 15ft. wide, and the south aisle about 12ft. in the western, and 26ft. in the easternmost bay. The tower is 25ft. square above the base, 79ft. high from the pavement to the top of the parapet, and thence to the top of the spire 89ft. The walls of the church are to be built of slate stone from Mr. Herrick's quarries, lined internally with red brick and freestone from the Doulting quarries, in Somersetshire. The same is to be used for all external dressings, and for the spire throughout. The architect is Mr. Ewan Christian, of London. The contracts for the building are in the hands of Messrs. Osborne Bros., stonemasons of Leicester.

OLDHAM.—The foundation stone of a Primitive Methodist Chapel and schools has been laid in Henshaw-street, Oldham, The chapel is to seat 1000 persons, and the schoolroom will hold 1000 children. Mr. John Wild, of Oldham, is the architect, and the total cost will be upwards of £4000. The work is taken by several local contractors.

THE GLOUCESTER CATHEDRAL RESTORATION.—The work of restoring the cathedral proceeds vigorously and with the best results. The beautiful south porch will have been completed in a few weeks; the south transept and the south aisle of the choir are both finished, and the restoration of the north aisle is in an advanced state. Last autumn some of the leading firms of decorators were asked to submit designs for the adornment of the choir vaulting. Acting upon the advice of Mr. Gilbert Scott, the Chapter a few weeks ago accepted the design of Messrs. Clayton and Bell. Already the decoration of about one-third of the choir from the east window—manifestly the most elaborate portion of the work—has been effected; and the remainder will probably have been completed in about two months. Sufficient of the scaffolding has been already removed to show that an effect of almost unsurpassing beauty will be the result. The bosses are gilded; the angel figures are partly gilded; and colour has been applied to the tracery; the panels are left untouched. Messrs. Clayton and Bell are also painting the vaulting of the chapel east of that of S. Andrew—which is to be restored in memory of the late Sir C. W. Codrington. A great improvement has followed the removal of the gallery in the south transept formerly occupied by the King's School pupils, and which concealed S. John Baptist's Chapel. By this and other removals the whole width of the cathedral from each end of the transept has been thrown open. But the full effect will not be manifest until the canopied seats are again fitted.

TURNWORTH.—Turnworth Church has just been re-opened, after entire re-building (with the exception of the tower) under the superintendence of Mr. G. R. Crickmay, architect, of Weymouth, the original plans having been prepared by the late Mr. John Hicks, of Dorchester. Sitting accommodation is provided for 150 persons. Mr. A. Green, of Blandford, was the builder, and the carving was done by Messrs. Boulton and Son, of Cheltenham.

BUILDINGS.

BATLEY.—There is in course of erection at Batley a drill shed for the rifle volunteers. The building comprises a drill hall, 31yds. by 18yds. inside, which will be lighted from the roof. The entrance to the shed will be through the centre of front buildings—officers' room and sergeants' house—and be wide enough to admit of the men marching through by fours, or sections in case the companies are not strong. The hall will be 14ft. high at the sides and 22ft. high in the centre, ceiled partly up the spars. The roof is to be constructed chiefly of wood, strengthened with iron, and will be ornamented in stencil work. Besides this hall, and the room and house before named, there will be lavatories, committee rooms, &c. The entire cost of the structure and the land will be £1800, and the opening is expected to take place in November next. The architects are Messrs. Sheard and Hanstock, R.I.B.A., of Batley.

GRANTHAM.—The assembly room of the new Town Hall, Grantham, was opened on Wednesday, thus completing the gradual opening of the building. The assembly room occupies the entire front of the main building, is 60ft. by 30ft., and 21ft. high, and is capable of dining with comfort about 200 persons. Mr. W. Watkins, of Lincoln, was the architect of the whole of the buildings, nd Mr. Wartnaby, of Grantham, the contractor.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

RECEIVED.—G. H. G.—J. R. A.—C. N. T.—O. W. D.—S. M.—F. M. J. B.

J. W. TROWNSON.—With sketches of Godolphin House, Cornwall.

H. H.—Cannot promise when any particular sketch will appear.

J. BARTON.—Yes, The agent is lazy or obstinate.

Correspondence.

VITRUVIUS CORRECTED.

(To the Editor of THE BUILDING NEWS.)

SIR,—That Roman houses were "six stories high," must be regarded as the most important of the many discoveries Dr. Zerffi has lately made, proving, as it necessarily does, that the architect Vitruvius, Pliny, and Cicero, though they are supposed to have described things which were under their eyes, yet knew not what they were talking about, and that Winckelman and all other modern writers who have regarded the houses in the disentombed cities, Pompeii and Herculaneum, as exact illustration of what the Roman house was, are all of them wrong, such testimony and evidence being altogether and in a double sense one-storied!

Because Dr. Zerffi finds that a limit of 70ft. was put to the height of Roman houses, he, with his ideas narrowed by what he has been accustomed to, jumps to the conclusion that such houses must have been divided into six floors. But the problem is capable of solution in a way perfectly in accordance with ancient writers and known facts. For instance, we are told that the house of Scaurus had columns 30ft. high. These, no doubt, were in the atrium, and represent the height of the ground floor; the entablature would be another 7ft., and with *one* upper floor and roof would go far to reach the height of extravagance prohibited, even 70ft. So we may still suppose that Pliny, when in describing his Laurentine Villa says, "the same principles are to be observed in country houses as in town houses, except that in the latter the atrium lies next the door," knew something of the subject; that Vitruvius was not quite an idiot in only defining one kind of house, and may relieve Dr. Zerffi from further taxing his wits to prop up his six-storied structure.

My statement was not about the existence of the word Attic in the writings of Vitruvius, but a denial that the Latin author countenanced Dr. Zerffi's views. The extract from Dr. Smith's work amounts to this, and which is similar to the statements of Dr. Lübke. I find that the Athenians made such refinements on the Doric and Ionic Orders or styles as to warrant the use of the terms "Attic Doric" and "Attic Ionic." This is a very different matter to the assertions of Dr. Zerffi about a separate and independent order, "that the Doric and Ionic styles *were melted into one*, forming the Attic style." There was no need for Dr. Zerffi's description of the boundaries of Attica, except as a blind to divert attention from the real points at issue—a favourite trick of his. My expression had reference to the fact that from the predominating influence of Attica over the other states Roman authors almost exclusively refer to Attica, so originating the idea, I thought, which seems to possess the Doctor's mind that things Attic are not Grecian. As to Krell's "Doric style" and Lübke's "Fine Arts," I found that the library of the Institute of British Architects, though considered a good one, did not possess either of these works; that Krell's work was not in the South Kensington Art Catalogue, though supposed to contain everything valuable in art, nor was it in the British Museum Library. Lübke's book is in the Museum Library, but there is no evidence of

"four editions;" that, however, is a matter which more concerns the authorities there than me. They have only got one, but I considered the book little repaid me the trouble I had to find it. It is wretchedly illustrated and bad in subject matter, though whether the fault is in the translator or author I know not. It is certain that such description as that it gives of the Attic-Ionic style is utter nonsense.

One of your correspondents lately and very correctly observes that "the name of a writer can be of little consequence in a discussion where reasons are adduced for the opinions expressed;" I beg, therefore, still to remain, Sir, yours, &c.,

P. E. M.

WOLLATON HALL.

SIR,—There is not any doubt that this magnificent building was carried out by Robert and Huntingdon Smithson, father and son. The former died 1614, the latter 1648; but it is pretty certain that John Thorpe was consulted in the matter, for among his drawings are some of Wollaton, dated 1580 to 1588. The designs were bought by the late Sir J. Soane, at a sale, among many more by the same architect. Robert Smithson was probably Thorpe's pupil and successor.

Langport. T. S.

Intercommunication.

QUESTIONS.

[1861.]—DREDGING.—Can any correspondent inform me the average price of dredging with a steam dredger, say at per ton, to a depth of 5ft. below present bed of a river? Also the average cost of sheet piling where the piles will be about 20ft. long, half above the bed of the river, and half below?—PUPIL.

[1862.]—ARCHITECTURAL BOOKS.—Would some one oblige me by giving a list of the books the Royal Institute of British Architects recommends for the use of students preparing for the profession? The publishers' names would be of great assistance in procuring the copies?—M. B. ADAMS.

REPLIES.

[1852.]—BACK BOUNDARY WALL.—In houses erected in the 14th century, it was customary to use the materials found in the locality, and if the house were built of stone most undoubtedly the boundary wall would be built of the same material.—Hoss.

[1852.]—BACK BOUNDARY WALL.—In reply to "A Subscriber" respecting his back boundary wall being lined with red bricks, I am surprised to find any person of sane mind asking such a question; because he must have employed an architect to prepare a design for such a house as he describes, and the same architect was the proper authority to consult about the wall; which evidently had not been done, as no architect worthy the name would have allowed such a gross inconsistency to be carried out in connection with his work. Had I been the architect I should have considered it an insult to myself, as it is to the profession, for a client of mine to *beg* advice through the medium of the architectural press, when proper instructions might be obtained through a legitimate channel by proper means; and not convert the privileges offered by the press into a "vinegar bottle" to catch "flies."—J. S., Leeds.

[1853.]—VIBRATION OF BELLS.—In reply to "Constant Subscriber," allow me to say that there is no risk whatever if the arch be properly executed in hard burnt brick set in Portland cement, with a rise of 1½in. in each foot span. Although tower walls are rather thin, still, if built in long stones properly bonded, I would say both tower and vaulting are well calculated to resist the vibration of the heaviest peal of bells. It is well known that the uniting properties of brick in Portland cement are such that in a short time both become united in one solid mass; consequently there will be no thrust whatever on tower walls, but they will gain stability from the vaulting, as will also the whole structure.—PRACTICAL BUILDER.

Our Office Table.

A SINKING TOWN.—The condition of Lynn at the present moment must be far from satisfactory to its inhabitants. The Corn Exchange is sliding away from its front, the bridges are being undermined, and all the property near the river shows signs of "settlement." Settlement of property is in some senses desirable, but the settlement in question is too much like that proposed by Cromwell for Ireland to be very agreeable to the owners. These unpleasant results are attributed to the Norfolk Estuary Works and other "improvements" in the main drainage of the district, and it is believed, though the belief involves something very like a "bull," that no remedy can be devised which would not do more harm than good.

THE NEW APPROACH TO THE GUILDHALL OFFICES.—On Monday a new and most convenient approach was opened to the offices of the Town Clerk, the Sewers Commission, and Chamberlain's offices at Guildhall. The closure of the ancient approach to these chambers having been necessitated by the preparations for the building of the new library and museum contiguous to the old entrance, a new roadway has been prepared by Messrs. Mowlem, Burt, and Co., with convenient flagways, and a tramway for the easy transit of heavy goods. The new approach is close by the elegant building recently erected for the Coopers' Company, near the church of S. Michael, and leads immediately to the offices named by a very short cut northwards of the old back entrance to the hall.

DULWICH COLLEGE AND ARCHITECTURAL TYRANNY.—An apparently enraged "Old Inhabitant of Dulwich," has written a letter to the *South London Press*, under the above heading. The "Old Inhabitant" thinks "it is high time now for the governors of Dulwich College to consider their relations to Mr. Charles Barry. The 'profligate expenditure' upon the Houses of Parliament is fortunately a matter of general notoriety, but it is not commonly known that here, at Dulwich, we can more than cap every instance of architectural audacity, and of that irrational and wasteful profusion in which 'family architects' delight. * * * Let any man of intelligence examine carefully the new buildings of Dulwich College: he will find the exterior an outrage to his eye—the interior an outrage to his common sense. Let him ask how many expensive casements have been made only to be blocked up, how many doors will not shut, how many windows will not open, and how miserably defective are the general arrangements. He will then agree with me that £90,000 is a heavy sum to pay for gingerbread ornamentation and terra-cotta monstrosities. In August next her Majesty's Commissioners will proceed to frame a new scheme for the future administration of Dulwich College, and it is most important that they should receive all the assistance and information which can only be given by an intelligent organisation on the part of all interested. Let all the energy and intelligence of this neighbourhood be united to aid in the great work which lies before the Commission, and let the first demand be the removal of the deadly incubus of a permanent 'family architect.'"

NEW ARCHITECTURAL WORK.—An interesting work is shortly to be published under the title of "The Autobiography of an Octogenarian Architect; being a record of his studies at Home and Abroad during 65 years," by George Sedwell Taylor, architect. Mr. Taylor was joint author with Mr. E. Cresy, of the well-known work on the Architectural Antiquities of Rome, the Mediæval buildings of Pisa, and the revived architecture of Italy, 1824. The forthcoming work will be profusely illustrated by fac-similes of Mr. Taylor's original sketches, and will comprise among the subjects, the cathedrals of England, France and Italy—the temples of Rome, Greece, and Sicily, with plans from measurement, &c. We look forward to the appearance of this book with great interest. It is to be published by subscription by Messrs. Longman and Co., and the number of copies will be limited. We shall give a further notice of this work as soon as it has been published.

ARCHITECTS AND THEIR CLIENTS.—This quarrel between architects and employers. I don't see it is absolutely set at rest by any argument which has yet been advanced. It is urged that an architect sells to his employer not only the skill that plans the house and the labour that watches over its erection, but all the means whereby the house has been conceived and executed. The somewhat ignoble reason is, that otherwise the house owner cannot find out the courses of drains and chimneys. Highly practical, of course. But such treatment of architects may be expected in days when the architect is no regarded as an artist, but only as a somewhat more expensive builder. Sundry Philistines, indeed, think "the builder's clever clerk quite as good as any architect, and don't understand Mr. Architrave giving himself such airs." Most new houses, especially semi-detached villas, show how completely we can dispense with art. Useless to protest, it is under the dictation of the spirit of the age that the architect is not treated like an artist, and is ordered to send home his plans, just as the shoemaker is ordered to send home the last he has cut for you. If you have the last, and wish to employ another shoemaker, you can get it pared down or padded up without going back to the old shop. Why should an architect be more courteously treated than a shoemaker? The British Architects seem to see a reason; but had better bow to the Philistines, and ask, "Any orders this morning?"—Shirley Brooks, in *Illustrated London News*.

ARCHITECTURAL EXHIBITION.—The annual soirée of the Architectural Exhibition Society was held at the Society's Galleries, 9, Conduit-street, on Tuesday evening, under the presidency of James Fergusson, Esq., F.S.A. A numerous and distinguished company was present, amongst whom we noticed, Messrs. Edward I'Anson, Charles Babbage, E. E. Antrobus, Joseph Jennings, Charles Mayhew, R. Moreland, Jas. Spicer, Dr. Langdon Brown, W. Norman, Dr. Madge, C. Ballance, Professor Kerr, the Hon. Secretaries R. W. Edis and Rowland Plumbe), and many others of the leading architects. A choice display of Venetian glass by Messrs. Salviati—the electric battery by Mr. J. Sax, and Mediæval embroidery by Messrs. Brangwyn, shared the attention of the visitors with the excellent display of drawings on the walls, and the models in the museum adjoining. The musical arrangements, under the direction of Mr. Badderley, were all that could be desired.

ROYAL ARCHITECTURAL MUSEUM.—Sir Bartle Frere, K.C.B., G.C.S.I., delivered a lecture at the Royal Architectural Museum, Tufton-street, Westminster, on "Modern Architecture in Western India," Sir Walter James in the chair. Addresses were also given by Kazi Shahabudin and Dadabhoi Naoriji. We hope to give a report in our next.

A NEW PARK FOR LIVERPOOL.—A new public park for the north-east end of Liverpool, called Stanley Park, was opened on Saturday week by the Mayor and Corporation of the town. The park is finely situated, and comprises about 100 acres of land. It has been laid out, at a cost of about £42,000, by Mr. Kemp.

FOOT BRIDGES FOR PEDESTRIANS IN THE CITY.—An important report, said to be of a favourable character, will be brought up by Alderman Stone at the next ordinary meeting of the Court of Common Council, as to the practicability of giving additional accommodation at the crossings of the most crowded thoroughfares in the City, the question having been some time since referred to the City Police Committee on the memorial of Mr. Thomas Ivison, who has submitted a design for such purpose.

THE KENSINGTON-ROAD IMPROVEMENT BILL.—The short discussion which took place late on Tuesday night on what is called the "Kensington-road Improvement Bill," reminds the *Daily News* of the stale anecdote of Mahomet and the Mountain. The Great Exhibition building is so constructed that it does not "run square" with the road, and so the road must be altered to run square with the building. To do this, the fine row of trees that now skirt the present road must be cut down. It is also necessary to take a portion of Hyde-park for the purpose, and it is alleged that the price to be paid for the ground, £2000, is entirely under the value. Mr. Samuda said that the land was worth £100,000. It is remarkable that not one of the metropolitan members voted with Mr. Ayrton, who proposed the nomination of the committee. The Government were defeated by a majority of 13; Sir Henry Hoare's motion to discharge the order for the appointment of the committee being carried by 64 votes to 41. We understand that it is the intention of Government to make an effort to reverse this decision.

Chips.

Mr. L. C. Pillar, builder, has received the appointment of Surveyor to the Town Council and Local Board of Dartmouth, in the room of Mr. Williams, resigned.

The exhibition palace at Dublin has been sold to Sir Arthur Guinness, Bart., for £53,000, which is £10,000 more than the Government offered two years since for the buildings as a museum and school of science and art.

The Restoration Committee passed a resolution last week, directing instructions to be forwarded to Mr. G. G. Scott, to prepare plans for the restoration of Holy Trinity Church, Hull.

The Mexican Government has ordered Mr. Williams, an engineer, to survey the Isthmus of Tehuantepec for a ship canal.

A new episcopal church at Wick, the first which has been opened in Caithness-shire for upwards of 200 years, has just been consecrated by the Primus.

We notice a proposal to erect a memorial to Messrs. Herbert and Vyner at Oxford. Let us by all means do something to perpetuate the memory of their manly courage, but let us not entrust the memorial to the care of Oxford. Recent events at that most decorous University would induce us to prefer the New Cut.

Timber Trade Review.

Messrs. Churchill and Sims' sale by auction of timber, planks, boards, &c., took place at the Baltic Sale Room, Threadneedle-street, on Wednesday last, the 25th instant, and consisted of

30,000 spruce deals, &c.
60,000 Quebec yellow pine deals, &c.
36,000 Swedish yellow and white deals and battens.
70,000 Norway yellow and white deals and battens.
1,500 Pitch pine planks.
140,000 Prepared flooring and match boards.
6,300 Fresh Norway spars and poles.
178 Brack Riga wainscot logs.
60 Fathoms lathwood.
60 Loads Norway balk.
130 Loads Quebec waney board yellow pine timber.
19 Loads Moulmein teak timber.
18,000 feet Norway and Swedish laths.
50,000 feet Norway skirtings.
With trenails, &c.

	s.	d.		£	s.
Brisbane trenails ..... per 1000pcs.	70	0			
	£	s.		£	s.
Christiana 2nd yellow 2½ × 6½ Petg. std.	7	5	to	7	10
Do. 3rd do. 2½ × 7	6	5	,,	6	15
Do. 3rd do. 2½ × 6½	6	0	,,	6	19
Do. WR do. 1¼ 5 to 6½	3	10			
Do. WR white 1¼ 5 to 6	3	0			
	s.	d.			
Do. fresh spars 4 to 6in. ..... foot run	0	1½	,,	0	1¼
Do. poles 22ft., 2in. tops ..... each	0	11			
	£	s.			
Dram 2nd yellow 2½ × 6½ ..... 120 12ft.	7				
Do. 3rd do. 2½ × 6½	6	10	,,	7	0
Do. 3rd white 2½ × 6½	5	10			
	s.	d.			
Do. yellow balks 5 × 5 ..... load	29	0			
Do. 4 × 4 and 4 × 5	27	0			
	£	s.			
Frederickshald 1st white 3 × 9 120 12ft.	15	5	,,	15	10
Do. 2nd do 3 × 9	13	5			
	s.	d.			
Do. 1st yellow prepared flooring boards 1¼ × 6½ square	13	6			
Do. 1 × 6½	10	6			
Do. ⅞ × 7	8	6			
Do. ⅞ × 6½	8	3			
Do. ⅞ × 6	7	6			
Do. ¾ × 6½	7	0	,,	7	3
Do. ¾ × 6	6	6			
Do. 2nd yellow ⅞ × 7 and 6½	7	3			
Do. ⅞ × 6	7	0			
Do. ⅞ × 6½ and 6	6	0			
Do. white ⅞ × 7	8	3			
Do. ⅞ × 6½	8	3	,,	8	6
Do. 1st yellow, grooved, tongued and beaded ⅞ × 6	6	0			
Do. 2nd yellow do. ⅝ × 6½	5	0			
Do. 1st white do. ⅞ × 6	5	0			
Do. laths ⅜ × 1in. ..... 1000 ft. run	0	13½			
Fredrickstad 1st yellow prepared floor boards, 1 × 7 per square	10	0	,,	10	6
Do. 1 × 6½	9	6			
Do. 1 × 6 × 5	8	6			
Do. ⅞ × 7	8	3			
Do. ⅞ × 6½	8	0			
Do. ¾ × 6½	7	0			
Do. 1st and 2nd yellow do. 1 × 7	8	9			
Do. 1 × 6½	8	6			
Do. 2nd yellow 1 × 7	8	6	,,	8	9
Do. 1 × 6½ and 6	7	9			
Do. 1 × 6½	8	0			
Do. ⅞ × 6½	7	3			
Do. ⅞ × 6	6	9			
Do. 1st white do. ⅞ × 7	7	3	,,	7	6
Do. ⅞ × 6½	8	3	,,	8	6
Do. 1st and 2nd white do. 1 × 5½ and 5	6	9			
Do. 2nd white do. ⅞ × 6½	7	6			
Do. 2nd yellow grooved, tongued and beaded ⅞ × 5½	6	0			
Do. ⅞ × 5	6	0			
Do. 1st white do. ⅞ × 6½ and 7	6	6	,,	7	0
Do. ⅝ × 5 to 7	5	9			
Do. 1st white, grooved and tongued ⅞ × 6½	7	6			
Do. slating laths 1 × 3in. .... 144ft. run	1	7			
Do. 1 × 2½in.	1	6			
Do. ¾ × 2½in.	1	10			
Do. skirtings, 6 to 24ft. ..... 100ft. run	2	3			
Do. 8 to 23ft.	2	3			
Do. 7 to 22ft.	2	3			
	£	s.			
Gothenburg 2nd yellow 2½ × 7 Petg. std.	8	10			
Do. 3rd yellow 3 × 9	9	10			
Do. 2½ × 7	7	10	,,	8	5
Do. 1st and 2nd white 3 × 9	8	5			
Do. 3rd white 3 × 9	7	10			
	s.	d.			
Do. 1st yellow prepared floor boards 1¼ × 7 square	13	0			
Do. ⅞ × 7	7	3			
Do. 1st yellow grooved, tongued and beaded ⅞ × 7	7	0			
Do. 1st white do. ¾ × 7	7	0			
Do. ⅝ × 7	6	9	,,	7	0
	£	s.			
Georgia pitch pine 3 × 13 to 16 Petg. std.	12	0			
Do. 3 × 14 and 13	12	0			
Do. 3 × 11	11	15			
Do. 3 × 12	11	15			
Do. 3 × 9 and 10	10	15			
Holmsund 1st and 2nd yellow 4 × 9..	10	5			
Do. 3 × 8	8	15			
Do. 3rd yellow 3 × 11	9	5			
Moulmein teak ..... load	11	0			
Paskallavik lathwood 4 and 6ft. cub. fm.	4	10			
Do. 4, 5 and 7ft.	4	10			
Pugwash white spruce 12ft. 3 × 9 120 12 3 9	12	0	,,	12	5
Do. 13 and 15ft. 3 × 9	12	0			

	£	s.		£	s.
Pugwash white spruce 12ft. 3 × 8	10	15			
Do. 13 and 15ft. 3 × 8	10	15			
Pensacola pitch pine 3 × 9 to 13 Petg.	11	5			
Quebec 1st bright yellow pine :—					
Do. 12 to 15ft. 3 × 12 to 14	18	10			
Do. 12 and 13ft. 3 × 11	18	10			
Do. 12ft. 3 × 11	18	15	,,	19	0
Do. 10 to 14ft. 3 × 12 to 26	19	0			
Do. 10 to 13ft. 3 × 11	18	10			
Do. 10 to 14ft. 3 × 7 to 10	16	0			
Do. 10 to 13ft. 3× 7 and 8	15	5			
Do. 10 to 12ft. 3 × 9 and 10	16	5			
Do. 10 to 14ft. 3 × 9 and 10	16	5			
Do. 10 and 11ft. 3 × 11	16	0			
Do. 10 to 15ft. 3 × 9	16	0			
Do. 10 to 15ft. 3 × 7 and 8	15	0			
Do. 13 to 17ft. 3 × 11	18	10			
Do. 13 to 14ft. 3 × 11	18	10			
Do. 13 to 15ft. 3 × 11	18	10			
Do. 11 and 12 ft. 2 × 7 to 18	16	0			
Do. 10 to 12ft. 2 × 7 to 20	15	0			
Do. 10 to 12ft. 2 × 7 to 13	15	15			
Do. 10 to 13ft. 2 × 7 to 15	15	15			
Do. 10 to 14ft. 2 × 7 to 18	15	15			
Do. 6 to 8ft. 3 × 7 to 18	14	5			
Do. 8ft. 3 × 7 to 17	14	10			
Do. 8ft. 3 × 7 to 20	14	10			
Do. 6 to 9ft. 3 × 7 to 20	14	5			
Quebec 1st floated yellow pine :—					
Do. 12ft. 3 × 11	16	0			
Do. 12ft. 3 × 9 and 10	14	0			
Do. 12ft. 3 × 6 to 8	13	5			
Do. 12ft. 3 × 5 to 10	13	5			
Do. 10 and 11ft. 3 × 7 to 18	13	0			
Do. 8ft. 3 × 6 to 21	13	0			
Do. 8ft. 3 × 11 to 21	14	0			
Quebec 1st dry floated yellow pine :—					
Do. 12ft. 3 × 11	17	0			
Do. 12ft. 3 × 7	13	0			
Do. 12ft. 3 × 7 and 8	13	0			
Do. 8ft. 3 × 7 and 11	12	15			
Quebec 2nd bright yellow pine :—					
Do. 13ft. 3 × 12	13	6			
Do 13 and 15ft. 3 × 11 to 20	12	5	,,	12	10
Do. 13ft. 3 × 11	12	10			
Do. 12 to 16ft. 3 × 7 and 8	12	0			
Do. 12ft. 3 × 11	12	15	,,	13	0
Do. 12ft. 3 × 9 and 10	11	10			
Do. 12ft. 3 × 7	10	10			
Do. 10 to 11ft. 3 × 7 to 12	10	0			
Do. 10 to 15ft. 3 × 7 and 8	11	5			
Do. 10 and 11ft. 3 × 11	11	5			
Do. 10 to 16ft. 2 × 7 to 11	11	15			
Do. 10 to 13ft. 2 × 7 to 16	11	10			
Do. 10 to 13ft 3 × 2	11	0			
Do. 9 to 16ft. 3 × 10	11	15			
Do. 9 to 16ft. 3 × 9	11	15			
Do. 8ft. 3 × 11	10	10			
Do. 8ft. 3 × 7 to 19	10	5			
Do. 6 to 8ft. 3 × 7 to 21	10	10			
Quebec 2nd floated yellow pine :—					
Do. 12ft. 3 × 11	12	0			
Quebec 2nd dry floated yellow pine :—					
Do. 12ft. 3 × 11	12	10			
Quebec 3rd bright pine :—					
Do. 13 to 16ft. 3 × 11 to 23	9	5			
Do. 13 to 17ft. 3 × 11	9	5	,,	9	10
Do. 13ft. 3 × 11 to 21	9	5			
Do. 13ft. 3 × 11	9	5			
Do. 12 to 16ft. 3 × 12 to 25	9	10			
Do. 12ft. 3 × 11	9	5	,,	9	10
Do. 11 and 12ft. 3 × 11 to 26	9	10			
Do. 13 to 13ft. 3 × 7 to 12	8	15			
Do. 10 to 13ft. 3× 11 to 22	9	5			
Quebec waney yellow pine board timber load	3	15	,,	5	15
Do. 1st white spruce, 3 × 9 ..... 120 12ft	18	0			
Riga lathwood, 8 and 4ft ..... cubic fm.	5	5			
Do., 4, 6 and 8ft.	5	0			
	s.	d.		s.	
Do, brack wainscot logs ..... 18ft. cube	52	6	,,	55	
	£	s.		£	s.
S. John's white spruce 3 × 11 120 12ft. 3 × 9	13	10			
Do. (9, 10, and 11ft.) 3 × 11	12	5			
Do. 3 × 9	12	15	to	13	0
Do. (9, 10, and 11ft.) 3 × 9	11	10			
Do. 2½ × 9 to 3 × 11	12	10			
Do. ends 2 to 5ft. ..... 120 6ft. 3 × 9	5	0			
Sandarne 1st and 2nd yellow 4 × 9 Petg. st.	12	0			
Do. 3rd yellow 3 × 11	9	15			
Do. 3 × 8	8	0			
Swartwick 1st and 2nd yellow 3 × 8	8	10			
Do. 3rd yellow 3 × 11	9	5			
Do. 3 × 9	9	10			
Do. 3 by 8	8	5			
Schien 1st and 2nd yellow 2½ by 7	7	5	to	7	10
Do. 3rd yellow and white (short) 3 × 9	5	0			
Do. 3rd white 3 × 9	5	10			
Warberg laths ..... 360ft. run	0	5			

The floor boards quoted in the preceding list are at the square of 105ft. super. The following number of running feet of each width quoted go to such a square :—

140	feet run of	9-inch
160	,,	8 ,,
170	,,	7½ ,,
180	,,	7 ,,
185	,,	6¾ ,,
190	,,	7½ ,,
195	,,	6½ ,,
200	,,	6 ,,
210	,,	5¾ ,,
220	,,	5½ ,,
230	,,	5¼ ,,
240	,,	5 ,,

Dyewoods are quoted in Liverpool at the following prices :—

	£	s.	d.		£	s.
Logwood, Jamaica ..... per ton	4	7	6	to	4	15
Do. S. Domingo	4	10	0	,,	4	15
Do. Campeachy	10	0	0	,,	10	10
Do Tobasco	8	0	0	,,	9	0
Fustic Spanish	4	12	6	,,	5	0
Do. Tampico	5	5	0	,,	6	0
Do. Honduras	5	5	0	,,	6	0
Do. Jamaica	5	5	0	,,	6	0
Do. Cuba	9	10	0	,,	10	0

	£	s.	d.		£	s.
Nicaragua wood, solid	10	0	0	to	12	10
Do. small	5	0	0	,,	7	0
Lima wood	11	0	0	,,	13	0
Barwood	4	5	0	,,	4	10
Camwood	15	0	0	,,	25	0
Red Sandera wood	8	5	0	,,	8	10

THE RECENT GOVERNMENT SALES OF SURPLUS TIMBER.

These sales have been commented upon by some as being false economy, bur the fact is that the goods are really not wanted now that armoured vessels are built. Very few have any idea of the quantity of wood necessary to build an old-fashioned man-of-war. It is asserted in "Young's Annals of Agriculture" that the quantity of timber requisite for building a 78-gun ship would take the space of forty statute acres to grow upon. This may or may not be correct. Those curious on the subject can make their calculations on the basis of the following list, which gives the quantity of timber reckoned to be used in different-sized vessels of war, and without reckoning bulk-heads for cabins and accommodation for the crew.

120 guns 4200 loads of hardwood and fir
31,500 running feet of 2½, 3 and 4in. deals.
86 guns 3000 loads hardwood and fir
71,000 running feet of 4, 3, 2½ and 2in. deals.
70 guns 2500 loads hardwood and fir
24,000 running feet of 4, 3, 2½ and 2in. deals.
50 guns 1950 loads hardwood and fir
22,300 running feet of 4, 3 and 2½in. deals.

LATEST PRICES OF MATERIALS USED IN CONSTRUCTION.

TIMBER.

	£	s.	£	s.
Teak ..... load	12	10	13	0
Quebec, red pine	3	15	4	15
,, yellow pine..	4	0	5	0
St. John, N.B. yellow	0	0	0	0
Quebec oak	5	15	6	5
,, birch	3	15	5	0
,, elm	4	5	5	5
Dantzic oak	4	5	6	5
,, fir	2	5	4	5
Memel fir	2	5	3	15
Riga	2	15	3	2
Swedish	2	0	2	13
Masts, Queb. red pine	3	10	5	10
,, yellow pine ..	3	10	5	10
Lathwood, Dant. fm.	4	0	5	10
,, St P'burg.	5	5	6	5
Deals, pr C., 12ft by 3 by 9 in.				
Quebec, white spruce	12	0	17	0
St. John, white spruce	12	10	15	0
Yellow pine, per reduced C.				
Canada, 1st quality..	18	0	19	0
2nd do.....	12	0	13	0
Archangel, yellow ..	11	0	12	0
St. Petersburg, yel...	11	0	12	0

	£	s.	£	s.
Finland	6	10	8	0
Memel	7	0	9	0
Gothenburg, yellow	8	0	9	0
,, white ..	0	0	0	0
Gefle, yellow	9	0	10	10
Soderham	8	0	9	10
Christiania, per C., 12 ft. by 3 by 9 in yellow	10	0	12	10
Flooring Boards, per sq. of 1in., first yel.	7	6	10	6
First white.....	7	0	9	6
Second qualities	6	0	7	0
PUMICE STONE pr tn	6	0	8	0
OILS, &c.				
Seal, pale .. per tun	42	10	0	0
Sperm body.....	90	0	0	0
Cod.....	42	0	43	0
Whale, Sth Sea, pale	38	0	0	0
Olive, Gallipoli.....	55	0	0	0
Cocoanut, Cochin, tun	45	0	0	0
Palm, fine	39	10	0	0
Linseed.....	31	15	0	0
Rapeseed, Eng. pale..	45	10	46	0
Cottonseed	31	0	36	5

METALS.

		£	s.	d.	£	s.	d.
LEAD :—							
Pig, Foreign ..... per ton		18	0	0	18	5	0
,, English, W.B.	do.	19	5	0	19	7	6
,, Lead Co.	do.	18	15	0	18	17	6
,, Other brands	do.	18	5	0	18	10	0
Sheet Milled	do.	19	5	0	19	10	0
Shot, Patent	do.	22	0	0	0	0	0
Red or minium	do.	19	15	0	20	0	0
Litharge, WB	do.	0	0	0	0	0	0
White dry	do.	26	0	0	28	0	0
,, ground in oil	do.	26	0	0	29	0	0
COPPER :—							
British—cake and ingot ..... per ton		70	10	0	71	0	0
Best Selected.....	do.	72	0	0	0	0	0
Sheet	do.	75	0	0	76	0	0
Bottoms	do.	78	0	0	0	0	0
Australian	do.	73	0	0	74	15	0
Spanish Cake	cash	0	0	0	0	0	0
Chili Bars	,,	67	0	0	67	15	0
,, refined ingot		70	0	0	72	10	0
Yel. Metal Sheathing & Rods ..... per lb.		0	0	6¾	0	0	6¾

MEETINGS FOR THE ENSUING WEEK.

MONDAY.—Institution of Surveyors. Annual General Meeting. 8.

TUESDAY.—Institution of Civil Engineers. The President's Annual Conversazione. 9.

WEDNESDAY.—Society of Arts. Adjourned Discussion on Mr. W. P. Andrews Paper on "Railways in India." 8.

THURSDAY.—Society for the Encouragement of the Fine Arts. Lecture by W. Marston, Esq., D.C.L., "On the Tragic Element in the Drama and Fiction." 8.

,, Royal Institution. Lecture by Prof. Tyndall, LL.D., F.R.S. 3.

FRIDAY.—Architectural Association. Paper by Thomas Blaxhill, Esq., A.R.I.B.A. on "Papers." 7·30.

,, Royal Institution. 9.

SATURDAY.—Royal Institution. On Astronomy, by Prof. Grant, LL.D., F.R.S. 3.

Trade News.

TENDERS.

CHERTSEY.—For repairs and alterations at Spanish and Portuguese Jews' infant school. Mr. F. Lett, architect :—

Heaps	£263 10
King	252 0
Nightingale	233 10

CHERTSEY.—For works at Messrs. Waterers and Sons', Chertsey. T. Wonnacott, architect :—

Tulley	£1675
Adamson and Sons	1302
Goddard and Sons	1322
Easton, Bros.	1295
Nightingale	1216

CHERTSEY.—For shop and residence at Chertsey, for Mr. Waterer. Mr. Thos. Wonnacott, architect. Quantities supplied by Mr. J. Chester Lansdown :—

Tulley	£1675
Adamson and Sons	1392
Goddard and Son	1322
Easton Bros.	1295
Nightingale	1216

HENLEY.—For the erection of four cottages, New-street, Henley-on-Thames, for Messrs. Harris and Hewett. Mr. Frederic Haslam, architect. Quantities supplied:—

Ayres	£385 10
Scott	379 0
Clements	367 0
Willis	365 9
Simonds	354 0
Sadler (accepted)	350 0

HULL.—For workshops in Charterhouse-square, Hull. Mr. R. G. Smith, architect. Quantities not supplied:—

Marshall	£390 8
Clarkson	386 0
Fewster	383 0
Thompson and Son	376 0
Helas	363 0
Jackson	360 0
Barritt	352 0
Evington and Wharram	335 15
Hockney and Liggins	335 10
Barr, Bros.	335 4
Rennard	335 0
Stuniey	327 0
Robinson	325 18
Jackson	325 0
Steele and Darnley	316 0
Hutchinson and Son (accepted)	313 10

LONDON.—For alterations at 28, Cheapside. Mr. J. H. Rowley, architect:—

Crabb and Vaughan	£418
Scrivener and White	376
Beeton	360
Merritt and Ashby	355
Sharpington and Cole	352
Sheppherd	340
King and Sons (accepted)	315

LONDON.—For house and shop, Edgware-road, Kilburn. C. Foulsham, Esq., architect. Quantities supplied by Mr. Thomas Nixon:—

Carter and Son	£1593
Thompson	1576
Gammon and Sons	1531
Ebbs and Sons	1522
Scrivener and White	1448
Rankin	1330

NEW MALDEN.—For stabling, coach-house, and other works, for Charles Woodroffe, Esq. Plans prepared by Mr. James Jones:—

Pierpoint	£244 10
Summers	186 0
Jones	150 0
Adnitt and Salmon (accepted)	146 10

READING.—For the erection of stores, Gun-street, Piccadilly, for Messrs. Chancellor and Anderson. Messrs. W. and J. T. Brown, architects. Quantities supplied:—

Barnicoat	£800
Matthews	741
Sheppard	730
Wheeler, Bros. (accepted)	695

SALEHURST.—For new villa, &c., Salehurst, Sussex. Mr. G. Beck, architect:—

Bridgeland	£684 0 0
Skinner	509 8 4
Baldock and Brooker (accepted)	375 0 0
Parks (too late)	640 0 0

UXBRIDGE.—For new infirmary, and alterations to old Infirmary, &c., Uxbridge Union. Mr. C. J. Shoppee, architect. Quantities supplied by Mr. Sidney Young:—

Crabb and Vaughan	£2662
Cullum	2630
Reavell	2626
Hanson	2582
Hailey	2568
Goodman	2493
Taylor	2493
Nightingale	2473
Crockett	2425
Jackson and Shaw	2400
Tarrant	2397
Wicks, Bangs, and Co.	2390
Willans	2368
Hill, Keddell, and Waldram	2335
Fassnidge and Son	2294
Cooke and Green	2285
Kearley (accepted)	2197

WESTMINSTER.—For completing contract No. 1, residential chambers, Philipp's-street, Victoria-street, Westminster; corner block. Messrs. Hooper and Corpe, architects, Westminster:—

Spicer (accepted)	£2014 7

CONTRACTS OPEN FOR BUILDING ESTIMATES.

PLYMOUTH, June 10.—For the erection of a guildhall, law courts, and municipal offices. Whiteford, Town Clerk, Town Clerk's Office, Guildhall, Plymouth.

LEEDS, May 30.—For the erection of semi-detached villas at Arthington, near Leeds. William Bakewell, architect, 12, East Parade, Leeds.

SALTBURN-BY-THE-SEA, May 30.—For the erection of the Saltburn Convalescent Home. Mr. J. Oliver, F.R.I.B.A., architect, 66½, Northumberland-street, Newcastle-upon Tyne.

BRADFORD, June 13.—For the erection of a new town hall. W. T. McGowen, Town Clerk, Corporation Offices, Bradford.

SOUTH STAFFORDSHIRE GENERAL HOSPITAL, June 9.—For extensive alterations and additions to the above, Waterloo-road, Wolverhampton. William T. Grant, Secretary.

NORTH-EASTERN RAILWAY.—Darlington Section, May 30.—For the erection of a circular engine shed, at Middlesborough. J. E. Macnay, Secretary, Railway Office, Darlington.

NORTH-EASTERN RAILWAY.—Darlington Section, May 30.—For the erection of a large goods warehouse, at Middlesborough. J. E. Macnay, Secretary, Railway Office, Darlington.

LANCASHIRE AND YORKSHIRE RAILWAY, May 31.—For the supply of from 500 to 1000 sets of oak scantling for wagons. Wm. S. Lawn, Secretary, Manchester.

LANCASHIRE AND YORKSHIRE RAILWAY, May 31.—For the following works—Masonry, excavation, and ironwork for bridge, and altering road at Gannow, near Burnley; masonry and ironwork for foot bridge, at Chorley; masonry, timber, and ironwork for foot bridge, at Thornhill; and erection of gatekeeper's cottage, at Southport. Wm. S. Lawn, Secretary, Manchester.

LEEDS, June 11.—For the erection of Lot 6, Boar-lane William Bakewell, architect, 12, East Parade, Leeds; and Halifax.

HALIFAX, May 30.—For the erection of Unitarian chapel and school. WM. Bakewell, architect, 12, East-parade.

ARTHINGTON, NEAR LEEDS, June 5.—For the erection of semi-detached villas. William Bakewell, architect, Leeds and Halifax.

FALMOUTH.—UNITED DISTRICT SEWERAGE WORKS, June 21.—Contract No. 1.—For providing and laying about 5000 yards of best glazed stoneware socket pipe sewers, from 9in. to 12in. in diameter; also the necessary junctions, cleansing pipes, syphons, sand tanks, gulleys, sewer ventilators, &c. Contract No. 2.—Providing and laying about 2500 yards of best glazed stoneware socket pipe sewers, from 9in. to 21in. in diameter; also the necessary junctions, cleansing pipes, syphons, sand tanks, gulleys, sewer ventilators, &c.—Wm. Warn, Clerk, Falmouth United District Sewerage Board Office.

WATFORD LOCAL BOARD OF HEALTH, June 2.—For the supply and erection of twenty lamp columns, lanterns, and fittings. John Sedgwick, clerk, Watford.

WATFORD, June 2.—For the supply and laying of about 1800ft. of 12-in. and 9-in. glazed stoneware pipes, with gullies, ventilation, and inspection shafts, &c.; also for the supply and laying of a quantity of Denner Hill, kerb, and gutter stones, and the re-forming and metalling the Clarendon, S. John's, and Woodford-roads. John Sedgwick, clerk, Watford.

MAIDSTONE, June 13.—For the erection of offices for the Clerk of the Peace, near the Courts of Justice. F. Russell, Clerk of the Peace, Maidstone.

MARCH, CAMBS, June 8.—For the erection of a new chapel at March, in the county of Cambridge. Mr. John Usher, 44, High-street, Bedford.

TEDDINGTON LOCAL BOARD, June 11.—For the erection of about 2800 feet run of pipe drainage, with the necessary gullies, shafts, and side drains; also for deepening an existing pipe drain. Mr. T. Goodchild, the Surveyor to the Board, at Teddington.

STOCKPORT, June 7.—For the design and erection of an iron girder bridge across the river Mersey, within the district of the Local Board. Walter Hyde, clerk to the said Board, Stockport.

LEEDS, June 1.—For the erection of extensive premises in York Road, consisting of a shop, warehouse, and dwelling house, &c. Wilson and Bailey, architects, Central Market Buildings, Leeds.

GILDERSOME, WATERWORKS, June 9.—For excavating and laying and jointing of cast iron pipes for supplying the township of Gildersome with water. Wm. Lister, Clerk to the Sewer Authority, Gildersome.

GREENWICH DISTRICT, June 15.—For constructing and maintaining in repair, for eighteen calendar months, the several additional lengths of brick and pipe sewers, and other works. E. W. James, Clerk to the Board, Greenwich.

WAKEFIELD, June 18.—For building chapel and completing the south wing, and other works, to the House of Mercy, at Horbury, near Wakefield. Rev. John Sharp, the Vicarage, Horbury, Wakefield.

BRIDGENORTH, June 11.—For the rebuilding the tower of S. Leonard's church. Architects, Messrs. Slater and Carpenter, 4, Carlton-chambers, 4, Regent-street, London, S.W.

CUCKFIELD, June 4.—For certain repairs to the tower and wood spire of Cuckfield Church, Sussex. Mr. F. W. Holloway, Hayward's-heath.

HEREFORD, May 30.—For the works required in the erection of extensive outbuildings at Bishon farm, in the parish of Bishopstone, in the county of Hereford, Mr. R. C. Hill, estate agent, Marsh House, Newcastle, Staffordshire.

BATH STONE OF BEST QUALITY.

RANDELL, SAUNDERS, and COMPANY, LIMITED, Quarrymen and Stone Merchants, Bath. List of Prices at the Quarries and Depôts; also Cost for Transit to any part of the United Kingdom, furnished on application to

BATH STONE OFFICE,
Corsham, Wilts.

[ADVT.]

BANKRUPTS.

ACT 1869—TO SURRENDER IN LONDON.

Ephraim Burton, Lower Clapton, and Letts' Wharf, Lambeth, builder, June 6, at 11—William Bennett, jun., Queen's-road, Peckham, dealer in bricks and lime, June 8, at 11.

TO SURRENDER IN THE COUNTRY.

Henry Stapley, Tunbridge Wells, architect, June 6, at 3—David Willoughby, Forest-hill, builder, June 6, at 8.

ACT 1869.—PUBLIC EXAMINATIONS.

W. Tree, New Barnet, builder, June 3.

DIVIDEND MEETINGS.

H. Stuart, Pemberton, engineer, June 8—W. Eddy, Gosport, plumber, painter, and glazier, June 7—H. Moore, Southsea, lath render and builder, June 7—A. J. Mills, Fratton, engineer R.N., June 7—P. Hindmarch, Northallerton, timber merchant, June 2—G. R. Turpin, Walsall, painter, June 15—W. Thorne, Queen-street-place, City, Connaught-terrace, Edgware-road, and Barnstaple, railway contractor, July 2.

DECLARATIONS OF DIVIDENDS.

J. F. Carver, Fulham-road, and Brompton-road, ironmonger, div. 8s. 8d.—H. Tey, Birmingham, brassfounder, div. 2s.

BANKRUPTCIES ANNULLED.

George Tooley, Walmer-crescent, Notting-hill, builder, May 19.

PARTNERSHIPS DISSOLVED.

Freeman and Co., Nottingham, slaters—O'Neil and Lewis, Blackfriars-road, marble merchants and stonecutters—Shackleton and Co., Bradford, Yorkshire, engineers—Ching and Beal, Castle-street, Long-acre, Little St. Andrew-street, and Little White Lion-street, ironmongers and gas engineers—C. and S. Wadsworth, North Brierley, plasterers—Bridge and Walmsley, New Accrington, ironmongers—G. and G. Bell, Gateshead, builders—Harris and Son, Beech-street, and Grasshopper-court, St. Luke's, chemists and varnish manufacturers—Nesbitt and Nicholson, Cramlington, Northumberland, and Newcastle-upon-Tyne, builders—Dance and Stoney, Leeds, timber merchants—J. and T. Ridal, Barnsley and Sheffield, builders.

SCOTCH SEQUESTRATIONS.

George Killick Kent, Edinburgh, decorative painter, May 27, at 2—John Drysdale Cook, Glasgow, brassfounder, May 24, at 12.

Extensive Wharfage to Let at Chelsea.—River Frontage about 600ft. Also fine Wharfage in the Canal adjoining the West London Railway Goods and Coal Depot, all possessing great facilities for Merchants, Contractors, &c., and may be had on lease in parcels, or offers for the whole be entertained.—For terms, apply to Ashburnham Estate Office, Cremorne-road, Chelsea.

To Contractors, Builders, and Others.—Dry Brick Rubbish can be received at the extensive Wharfage forming a portion of the Ashburnham Estate, Chelsea.—For terms, apply to Estate Office, Cremorne-road, Chelsea.

To Let.—To Builders.—A most eligible Plot of Land, a part of the Ashburnham Estate, having about 240 feet frontage in King's-road, opposite St. Mark's College and the New Streets. The Plot of Ground is enclosed in a Ring Fence 8 feet high, and there is a Workshop of large dimensions, with General Office, well built, and lighted with sashes and skylights. The whole affords every facility for builders. The terms and ground-rents are low. It is within a short distance of Chelsea Station on the West London Railway, and easy of access to Steam Boats. Omnibuses pass within two minutes' walk every ten minutes. For terms, apply to the office, Ashburnham Estate, Chelsea.

Building Land to be Let or Sold in a beautiful district near to the station, 17 miles (45 m.) from London S. E. R. Season tickets, £21 and £16 5s. Gas and water services. Advances made. Would not object to change Land for good House Property. Plans can be seen at No. 8, George-street, Hanover-square.

To Builders. — Ealing, Main Road.—Frontage TO LET for building. Will let and sell before completed. One House can be bespoke, Close to a large goods and passenger station, now erecting. Gravel soil; two or four substantial carcases of private houses can be purchased next to some already sold before roofed in.—Rothwell and Clarke, Builders, Ealing.

Crystal Palace Company.—To Builders and others.—Crystal Palace Estate.—The Crystal Palace Company are prepared to let on building leases for a term of 99 years, certain portions of their freehold property abutting upon the Penge-road, Thickwood-road, Anerley-road, and Palace-road. Plans and conditions may be seen on application to John Norton, Esq., Architect, 24, Old Bond-street, W., or to Mr. Hart, Accountant, Crystal Palace, Sydenham, S.E

A Capital Brickfield to be Let, 17 miles east of London, having railway sidings and a large wharf. Plenty of excellent brick and tile earth, also fine sand and abundance of water. Fixed rent and royalty moderate. Immediate possession. No stock nor plant to be taken. For particulars apply to Messrs. Burder and Dunning, 27, Parliament-street, Westminster, S.W.

Dry Wainscot, 3 years old, price 6d. to 9d. M. became equally cheap, at JOHN COUMBE'S Lady Lake's Grove, Mile-end Gate.

To Builders, Contractors, and Others.—To be SOLD, several most substantially built 10 ROOMED CARCASSES, some partially finished, drained into the main High Level sewer, situate near the new church of S. George's, in the Tufnell Park-road, Holloway, a wide road leading out of the main Holloway-road, near the Nag's Head and close to the Favorite Omnibus Route. Apply to Messrs. Dalton and Jessett, solicitors, St. Clement's House, St. Clement's-lane, Lombard-street.

To Builders.—To be Let, on Building Lease, FREEHOLD LAND, situated within five minutes' walk of two railway stations, and within ten minutes' walk of omnibus to the City and West-end. Improved ground-rents purchased and materials advanced.—Apply to Mr. H. A. ALEXANDER, Architect and Surveyor 16, King William-street, City.

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THE BUILDING NEWS.

LONDON, FRIDAY, JUNE 3, 1870.

HOW £140,000 PER ANNUM COULD BE SAVED IN LONDON.

THE title we have chosen could have also well been that of the important Report* by Mr. Paget to the Metropolitan Board of Works, alluded to in our last number. By means of a long array of authenticated facts, and of freshly-culled statistics, a very strong case is made out that at least this sum could be annually saved to the ratepayers of the thirty-eight parishes and districts of the Metropolis in the maintenance of their 1200 odd miles of macadamised roads. The means pointed out for economising a sum that, capitalised at three per cent., represents four and a half millions, is simply the general adoption of the process of rolling roads by heavy steam rollers. It has been proved by the experience of years in Paris, Bordeaux, Liverpool, Sheffield, in the parks of London and New York, that the steam road-roller produces on the newly-laid metalling a solid surface at once able to withstand the traffic. Instead of the loose stones being crushed piecemeal and thrown about before consolidation, they are at once bound into a solid mass, avoiding the waste of costly material, which is at present ground into dust and mud.

Road-rolling by horses has been employed to a limited extent in England; but throughout France and Prussia all the roads, which are under centralised supervision, have been kept rolled for more than a quarter of a century. At present, rolling roads, whether by steam or horse power, is in England ignorantly looked upon as only a refinement—a process for merely smoothing over the road, and not as a means of saving in maintenance. And yet the practical results, merely as regards economy of maintenance, and without reference to the saving to the proprietors of vehicles, have been such that the average of seven estimates, made at different times by different French, Prussian, and English engineers, gives a saving in materials and labour of more than 40 per cent. per annum effected by horse rolling

It is clear that the substitution of steam power for horses must produce a yet greater economy in duration of the road, in materials, in labour, and in horse draught. In Paris the six years' contract for steam-rolling all the roads of that city and its suburbs is taken at just one-half the price formerly paid by the Administration for horse-rolling.

As regards the increased durability of the roads, the result of the last ten years' experience in Paris has led to the estimate that the duration is actually double that produced by horse rolling.

The steam roller, from its greater weight, from the metalling not being disturbed by horses' feet, and from other causes, is of course much more efficacious than the horse roller. If, therefore, a percentage of only 10 is allowed on account of its superier action, there is a gain of at least fifty per cent of increased durability of the roads, as compared with no rolling at all. This estimate does not take into account the great saving in labour in maintaining the road, and necessarily also in scavenging and watering.

The report contains a careful examination into the causes of this extraordinarily increased duration; and Mr. Paget ascribes it to a diminution in the actual wear by the traffic, and to the fact that the interlocking of the stones produced by rolling prevents the injurious action of soft mud and dung, and of the presence of moisture. On a rolled road, the traffic wears the road by attrition only; and the moisture cannot disintegrate the road by dissolving the mud that gradually works its way down an unrolled road.

By means of an elaborate collation of the experiments of Morin, Umpfenbach, Dupuit, Macneill, Telford, Hope, Rumford, Gordon, Bokelberg, and Bevan, the author proves that the draught on the loose metalling of an unrolled road is not less than five hundred per cent. more than on a road in a fairly good state.

After showing that "increase of draught means increased injury to a road," and tracing "the increase of draught with the deterioration," he observes that—

> Some experiments made by Mr. Bevan on the force of draught of carriages have shown that it is 1-5th on a loose, sandy road; 1-7th on a turnpike road *newly* laid; 1-9th on an ordinary bye-road; 1-19th on a hard, compact loam; 1-25th on dry, hard turf; 1-29th on a turnpike rather muddy; and on a clean turnpike road only 1-33rd. So that according to this, five horses will draw the same load on a good road that would require thirty-three on loose sand. If the cost of draught on a good road be taken at sixpence per mile, it rises two shillings and twopence on a newly-gravelled road, or from four to five times as much. The resistance to draught is therefore nearly five times more on freshly laid metalling than on a road in a fairly good state. In other words, one ton draught on a road in a fairly good state is raised to five tons for the unhappy horse whenever it has to pass over an unrolled patch of road. It has, for a short space, to do five times as much work. It is in this respect that animal power beats the steam engine, no form of which can suddenly give out five times the useful effect it was constructed to develop. The benefits of road-rolling to owners of horses and vehicles would therefore be enormous.

As regards the actual application of these deductions to the macadamised roads of London, we gather the following facts from an elaborate table at the end of the report:—That there are upwards of 1120 miles of macadamised roads in the thirty-eight metropolitan parishes and districts alone; that the area of these is at least 22,000,000 square yards; that the surfaces of many metropolitan roads require renewing several times every year; that there were expended on the roads and streets in the London parishes and districts during the year 1867, £714,662; during the year 1868, £781,003; and, lastly, that of the above expenditure, the average annual cost of maintenance, exclusive of cleansing and watering of the macadamised roads, is £280,750 in all, or at the rate of about £250 per mile. According to the experience of the last ten years in Paris, at the very least half of this £280,750, or £140,375 per annum could be saved by steam rolling. It must be remembered that this is within the Metropolitan parishes alone; for Mr. Paget estimates, on very sound data, that within a radius of only twelve miles from Charing-cross there are upwards of forty millions of square yards of macadamised roads, all of which might be rolled. London is also very rapidly increasing. Mr. Haywood, the Engineer to the City Commissioners of Sewers, estimates that the outskirts of London are being covered by houses at the rate of at least two square miles per annum.

In the face of these facts, simple enough in themselves, but astounding by juxtaposition, it will be asked why the London roads, in spite of endless complaints, are without the benefits of steam rolling, so long enjoyed by the Paris roads. The answer is to be found in the divided administration of this helpless province of houses.

As the author reminds us—

> Macadam wrote nearly fifty years ago that the defective state of the London roads was due to causes "the greatest" of which appeared to be "the division of the roads into so many small trusts, which precludes the possibility of any extended plan of operations for the benefit of the whole." In his time, and still not sixteen years ago, there were as many as seventy-seven parishes in the metropolis each keeping up its own road area. The administration was thereby so utterly unmanageable, that many of these parishes have been amalgamated into District Boards of Works. Including the City, the metropolitan area is now managed by thirty-nine different Boards of Vestries. There are besides a number of separate and independent road trusts, such as the Metropolis Roads, outside the Metropolitan area, Cubitt's Trust, the Commercial Roads, and others. "While London is thus divided into thirty-nine districts for one purpose, it is," remarks Mr. C. Buxton, M.P., "also divided into sixteen for another; ninety for another purpose; fifty for another; besides a multitude of other divisions. More than one hundred Acts of Parliament are in force for the government of London, and there are no less than seven thousand honorary officials, besides a host of paid officials." Nearly £3,000,000 sterling are annually collected and expended by the thirty-nine local governments of London.

On this very subject, a few weeks ago, Mr. Edwin Chadwick, the well-known sanitary reformer, in the course of a discussion on Tramways at the Society of Arts, asked whether the vestries could be expected "each to purchase steam (rolling) engines and set up establishments only for the manipulation of its own bit of road."

In fact, few, if any, of the separate parishes could keep a roller and its staff continually employed; and there would be the obvious result of much waste of capital from its lying idle, as is the case, the greater part of the year, with the Government steam-roller in Hyde Park. So that this state of things still exists, in spite of the favourable opinion of road-rolling held by the generality of the London Parish and District Surveyors, whose opinions we lately quoted from Mr. Paget's elaborate report.

* Report on the Economy of Road-maintenance and Horse-draught through Steam Road-rolling; with special reference to the Metropolis. By F. A. PAGET, C.E., etc. Printed by order of the Metropolitan Board of Works, May, 1870.

THE ARCHITECTURAL EXHIBITION IN CONDUIT STREET.

(*Continued from p*

NO. 31, The Whitgift Hospital Middle Class School, lately erected at Croydon by A. W. Blomfield, seems to have a simple and good plan, but the tower is advanced too far forward, and divides the design too distinctly. The style is a poor Perpendicular, which we regret. Mr. Blomfield also sends two photographs, Nos. 25 and 26, of the interior of his S. Barnabas Church, at Oxford, which we reviewed last year. We consider this to be his best, and a really fine work. No. 27 is a frame containing three photographs of his S. Mary's Church, Strood, Kent, a far more pretentious, but much less successful work. We should counsel him to keep to Romanesque, or at least to impart some of its sobriety into his Gothic designs.

No. 32.—The Gaiety Restaurant, by C. J. Phipps, a work with many merits, but not a few defects. In the drawing, the poverty of the cornice and parapet is obtrusive, and the stilted segmental arches over the ground floor are unpleasant. The treatment of the two stories above is far better.

No. 35 is a pen and ink drawing of the interior of a satisfactorily and originally-treated Early English new church, at Bandon Hill, Beddington, Surrey, by Joseph Clarke. We do not quite understand the lines of corbelled recesses in the wall behind the stalls. Of Mr. Clarke's other designs, No. 53, S. Philip's Church, Whitewood, near Monmouth, and 79, New Church, Apsley End, Herts, exterior views, we cannot say more than that they are ordinary village churches with correct detail. He exhibits also two domestic works, No. 64, Row Tor Manor House, Derbyshire; and 67, Lindfield House, Sussex. The former is very unpretentious, but the latter is a Tudor mansion of some importance, with good grouping and quiet detail.

In No. 36 Mr. Charles Gray shows a very ornate design, entitled "Suggested Alteration of the Chancel of S. Paul's Church, Knightsbridge."

Mr. Ewan Christian is somewhat unfortunate as to the colouring of his drawings, which is too heavy. No. 37 shows the exterior, and No. 46 the interior, of the New Chancel of the Collegiate Church of S. Peter's, Wolverhampton, by this architect. It is a stately structure of ample length, with four bays, and an apsidal termination beyond of flowing Decorated architecture, the windows lofty and well raised-up, and with well-proportioned buttresses between them. There is a good parapet, well managed at its

junction to the central tower. Within there is a good space for decoration left beneath the windows and above the stalls, but the suggestion for this decoration in the drawing is of a mild type. The treatment of the roofing of the chancel with a species of wooden vaulting to the apse is unusual and good, and colour is happily applied to it. Mr. Christian also exhibits No. 192, Lavington Manor, Wilts, recently completed for the Right Hon. E. V. Bouverie, M.P.—again an unpleasant and heavy drawing of a large and stately Tudor mansion, deficient in sky-line, the only tower being a poor one and ill-placed; the style of the building otherwise is simple and unpretentious, and sufficiently satisfactorily treated.

Mr. Ellison's drawing, No. 44, Legislative Hall, Douglas, is a coarse drawing of a building which, we fear, will be very clumsy in execution, even if effective in general outline.

No. 48 is a drawing of several shops in the Fulham-road, recently executed from the designs of Mr. Lacy W. Ridge. Although we hail every attempt to improve our street architecture, and acknowledge the difficulties which those who endeavour to do so have to fight against, we can only acknowledge a very slight step in the right direction; but a step, certainly, in this present instance. The materials are honestly used, and relieved by colour; the upper portion is the worst, the cornice being thrust down, as it were, upon the heads of the top windows.

Mr. David Brandon sends but one, and that a pleasing drawing (No. 40), showing the south-west view of Binnegar Hall, Wareham, Dorset, erected for Oliver Farrer, Esq. It is a simple Elizabethan structure, and a fair design of ordinary character in that style, with the turret well introduced for effect.

Mr. Ferrey also contributes a single drawing, too cold in hue—No. 51, Huntsham Court, Devon, now in course of erection for Charles Troyte, Esq. It has similar merits to the last-named, and it is somewhat more ambitious in its grouping; yetthis is not altogether satisfactory; the detail, as might be expected, is correct in treatment.

Mr. Ralph Nevill has an ambitious competition drawing, showing the Interior of his design for the Borough Court of Bradford; it is far superior to the exterior, which we criticised at the Academy, and a photograph of which is shown here in No. 13. The plans which are attached to the latter have considerable merit in their arrangement round two interior open courts.

Mr. Seddon is the contributor of only one drawing, No. 52, Portion of Powell's Almshouses, Fulham—a pleasing group, with a quaint tower and open staircase up to a room on the first floor of same. A belt of sculpture concentrates the ornaments on the centre of the tower and the gable of the buildings in a line with it; a lean-to roof along the front of the almshouses covers a projecting bay window to each, and forms a sort of arcaded porch between. The drawing, which is somewhat muddy, is evidently not by the architect himself, as is that exhibited by him and noticed by us in the Academy.

No. 56, Glenbegh Towers, in course of erection, near Killarney, by Messrs. Godwin and Crisp, is a picturesque fortress rather than a mansion; which, though it would be an anomaly in England, is certainly not so under the present state of things in Ireland. The breadth of effect and grouping are exceedingly artistic.

No. 57, Plaes Groes, Horton, Cheshire, a view of a villa sadly out of drawing, and with many misplaced features used as ornament in the structure.

No. 69, by the same architect, of S. Nathaniel, Oliver-street, Liverpool, is a forbidding looking brick building, but with an effective belfry stage to the tower, with a slated high roof.

Nos. 58 and 59, by Goodman and Vinall, are sketches of houses with ordinary sash windows, to which some character has been given by carrying up the tiled roofs as simple pyramids, and covering the upper story of the walls with plain tiling.

No. 60 is a weak sketch, by R. Armstrong, jun., of Ramsay Abbey, showing a new entrance hall, which has three-light windows, with flat traceried heads and two lines of transoms, so that their proportion is inordinately long. The interior of this hall, shown in No. 115, is stately, but the detail late and poor.

No. 61, Proposed National Hospital for Incurables, Cowley, S. John, Oxford, by C. Buckeridge, shows part of a fine internal quadrangle, into which projects the circular apse of the District Church of S. Mary in a picturesque manner; the cloister walk is carried round this with an open arcade of pointed arches or coupled columns. The character of the whole of the design is quiet and good, and thoroughly Mediæval in spirit.

196, 197 and 198, are sketches in pen and ink by the same architect for school buildings at York Town, and churches erected by him at Newbold Pally and Caerphilly. The drawings are weak; the building fairly treated with simple but ordinary Gothic detail.

Mr. S. Teulon sends drawings, Nos. 66, 75, 76, and 340. The first represents Branch Hill Lodge, picturesque additions to a Gothic mansion somewhat eclectic in detail, but good in form and outline. The entrance doorway is circular, arched beneath a lean-to projection from an octagonal bay, flanked by towers of different design. The others show his clever but peculiar modification of the Church of S. Mary, Ealing, and S. Stephen's, Hampstead, in a lithograph, an equally bold and certainly effective new church.

Mr. Charles F. Hayward sends No. 67A, a drawing of Bromley Lodge, Essex, as re-erected by him. This is not happily grouped, and the dormers are out of place in connection with so flat a roof. No. 158 is a pencil drawing of the Church of the Holy Innocents, East Shefford, with details it is impossible to speak with approval. His design for Public Offices for Plymouth, shown in drawings Nos. 164 to 167, have considerable merit as to plan and arrangement, but we do not think that the contiguity to the site of a Perpendicular Church is an excuse for the hybrid character of the details adopted by him for his design.

As to Messrs. Henry Jarvis and Son's design for a Church at Stepney, Nos. 65 and 68, we congratulate the locality on its not having been the accepted one in the competition.

No. 85, competition design for Grammar School, Kingston-on-Thames, by Thomas Goodchild, is suitably and well grouped, and the detail modest and inoffensive, if not brilliant. The drawing is a good one in pencil, touched with Indian ink.

We are compelled to defer the rest of our remarks upon this collection of desi gns to another opportunity.

KEEP THE AIR IN MOTION.

THESE are days of wonderful appliances for warming our churches and other public assembly rooms; and, judging from the miles of hot-water pipes one may see in buildings recently erected or in course of completion, a tolerably good trade is being carried on in this iron age. It is true these long pipes and mysterious-looking coils do not often invade our ordinary dwelling-houses, shops, banks, warehouses, and work-rooms. These are, in all large towns, fitted up more or less with gas, ostensibly for purposes of *light* during the winter months, but really with the effect of affording *warmth* to the occupants to their hearts' content. Who is there, unblessed with the fabled endurance of the salamander, that does not hail the advent of the long summer days that will deliver us from the winter's torture of inhaling the scorched "air" we are doomed, in nine rooms out of ten, to consume for the sake of enjoying the brilliant gas-light? We are slowly—too slowly, to judge from a treatise on Respiration* lately written—arriving at the conclusion that no comfort is to be had in a gas-lighted apartment, however large, unless provision be made for effectually getting rid of the heated air, or rather the products of combustion, as fast as they are generated. We may see frequently in the public newspapers advertisements for apartments in dwelling-houses "where gas is not burnt;" and in our own advertisement columns there may here and there be found diagrams of ventilating gaseliers and other appliances for removing the heated "air," so called. Would that they were brought into more general use!

Mr. Scott's treatise is mainly addressed to pathologists, and to those who are interested in questions of the action of air upon the blood, &c., into which few architects have leisure to enter, were they even familiar with the scientific technology of the writer. But the 4th section of the work contains a good deal of matter in which all architects and builders, not to say the general public, are really interested. Few of the former are absolutely ignorant of the laws of ventilation insisted upon; but we do not remember to have seen a book in which such strong facts are brought together to remind us of the absolute necessity of providing means for the continual exchange of air in buildings of every description, no matter how lofty or spacious may be the halls or apartments of which they consist.

Public hospitals naturally engross many of the writer's remarks. The public are just now so fully alive to their sanitary requirements that it is hardly necessary to say much about them. No *new* hospitals are likely to be built wherein, as the writer tells us, the moist air of the wards breathed over and over again infuses its foulness into the paper on the walls, the bedding, and the clothing of the inmates. One instance of the well-ascertained danger arising from such neglect of ventilation will suffice. Here it is, and in a pretty intelligible form:—

> That hundreds of thousands have been the victims of public ignorance on this important matter may be shown by a single example. The deaths of new-born infants between the ages of one and fifteen days, which, in the Dublin Lying-in Hospital, amounted in the course of a few years of late to 2944 out of 7650 births, were suddenly reduced to only 279 deaths during the same period after a new system of ventilation had been adopted. Thus more than 2500 deaths, or one in every three births, must be attributed to the bad ventilation found in this one hospital.

The great problem for all hospital builders, and, indeed, for the builders of every tenement for human and animal occupation, is *to keep the air moving*. The writer strongly urges it throughout the section, and gives the following quotation from Dr. Andrew Combe, showing the general safety from infection where this simple rule has been attended to:—

> Typhus fever is much more easily communicated by breathing the confined and loaded air near the body of the patient than even by the touch. Hence, also, the general safety of the attendants where ventilation is sufficiently observed, the frequent renewal of the air diluting and carrying off the poison.

What follows in this section of the book is of more immediate value to architects, treating as it does of the vexed question of cubical space to be allowed in buildings for purposes of salubrity. Of course, in the case of all structures for breathing in, the greater the space the smaller the danger of defective ventilation. In the large sick asylums of which we have lately heard so much, architects have been instructed to provide (if we are to believe Mr. Scott) something more than enough space for good ventilation, and loud have been the complaints of metropolitan ratepayers. Mr. Scott gives us what these last all desiderate—a minimum of cubic space

* The Principal Facts of the Chemistry and Physiology of Respiration, applied to the preservation of Health and the Promotion of Mental Science. By John Scott, author of "The Philosophy of the Chemistry of Nature," &c., &c. Edinburgh: Maclachlan and Stewart.

to be provided for each individual; simply stipulating that the air introduced into it shall not be allowed to remain stagnant—shall, in fact, "keep moving." He says, after speaking of the required proportions of carbon to oxygen, as to which our readers may consult his treatise for themselves :—

If we take the air as already half saturated with water (which may be assumed to be its usual condition in this country) 250 cubic feet (of such fresh air) must be supplied (for each individual) every hour to ensure perfect ventilation and keep the atmosphere free and untainted. The foul air must at the same time be carried off. A space containing 2500 feet of air, and receiving no fresh supply, will not serve the purposes of healthy respiration during ten hours equally well with one containing only 250 cubic feet of air, but renewed every hour for ten successive hours. In ventilation, therefore, the object must be to remove the foul air as fast as it is formed, and for this purpose a minimum supply of 250 cubic feet of fresh air should be hourly introduced for every individual present.

Now, 250 cubic feet of air will, in rough calculation, be found the quantity provided by a cell or apartment six feet long, six feet wide, and seven feet high—a space much more restricted than that allowed in an English "certified" prison cell. In such cells the air is by artificial extraction continually undergoing a process of consumption and renewal, by means of foul and fresh air flues.

What follows with reference to the ill effects of crowded assemblies in large ill-ventilated halls is well worth the serious attention of every architect. Mr. Scott says, at page 87 :—

The languor, exhaustion, and headaches which occur in crowded assemblies are just so many warnings that ventilation is not properly attended to; that the lungs are insufficiently supplied with oxygen to de-carbonise the blood passing through them, and that the system is suffering the evil consequences which such circumstances are fitted to produce. When these warnings are neglected, and the same air continues to be breathed again and again, the proportion of carbonic acid at last becomes so large that its presence in the inhaled air prevents its further elimination from the blood. It thus acts as a poison, *and extinguishes life.* This result occurs very speedily when the quantity of carbonic acid in the air reaches *the amount of ten per cent.;* but a much smaller quantity, especially *when combined with animal effluvia, is sufficient to produce fatal effects* when its action is prolonged.

The *italics* are our own. After some further remarks on the functions of the respiratory organs, unnecessary to quote, the author gives from Dr. Combe some instances of the deadly effects of sulphuretted hydrogen, and proceeds with some other particulars of interest to our readers. He says, of sulphuretted hydrogen :—

This gas is developed from decomposing animal remains, and becomes exceedingly dangerous in close places, where it is prevented from being diffused in the atmosphere. Hence it is a frequent cause of death to workmen who descend imprudently into common sewers before sufficient time has elapsed to allow the noxious vapours to be dispelled. An accident of this kind, in which several individuals lost their lives, happened in a common sewer in Pimlico in the autumn of 1849.

Oxide of carbon he describes as a gas so deadly in its nature that one per cent. mixed with common air destroys a dog in two minutes. Of this deadly gas he says :—

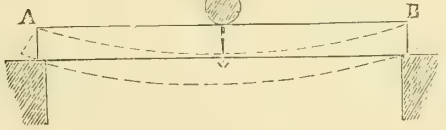
* * * * * It is the occasion of many fatal accidents in our own country from sleeping in bedrooms where the draught of the chimney is imperfect, and the admission of fresh air is impeded.

This, we fear, may be predicated of too many bed-room fireplaces with short chimney-flues, whose lighted fires give out this deadly gas.

The book will be found to contain much information in proof of the mischief that has arisen from time to time from confining human beings, for even a short space of time, in imperfectly ventilated places, such as occurred in the well-known case of the "Black Hole of Calcutta," fatal to 123 prisoners out of 146, confined for only one night in a room 18 feet square, and provided with two small windows; and the more recent terrible case of the Irish steamer Londonderry, wherein of 150 cabin and steerage passengers, closed down under hatches for one night, owing to stormy weather, 72 were found next morning suffocated to death. All due to ignorance, or let us say to forgetfulness, of the simple fact that human beings cannot live without having a sufficient supply of fresh air to breathe.

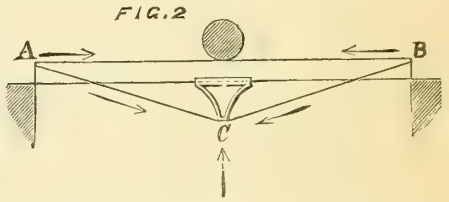
TRUSSED GIRDERS—II.

THE accuracy with which the amount of the strain upon the different parts of a beam or girder can be ascertained by separate and independent methods of calculation was demonstrated in our last article on this subject so simply and so conclusively as to be intelligible to the veriest tyro in the profession. As, however, we were unable in one article to do more than introduce the subject, the question has probably arisen in the minds of some of our readers, What is the use of trussing a beam, and what gain in strength and material is thereby obtained? This question is a manifest result of the fact that the strain upon the beam, whether trussed or untrussed, was the same under similar conditions of span, depth and loading. A little reflection will point out that this apparent paradox is capable of an easy explanation. It is true that the amount of the strain upon the beam itself is the same whether it be trussed or untrussed, but its nature is different. When the beam is untrussed the strain is of a transverse character, and tends to cause deflection. When the beam on the contrary is strengthened by tie rods, the strain is supposed to cause no deflection, but to compress the beam longitudinally from the ends to the centre. This will be best explained by reference to a diagram. If A B in fig. 1 be a beam supporting

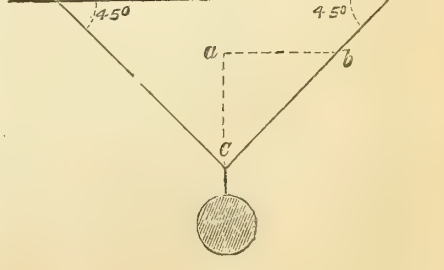


a load at the centre, the whole pressure comes upon the beam at that point in the direction of the arrow, and there is nothing to resist this pressure but the beam itself, which consequently follows the direction of the weight and deflects. The strain, therefore, upon the centre of the beam in fig. 1 is a direct transverse one, tending to break it at that point. Let us now examine the same beam in fig. 2 under similar circumstances, with the exception that it is trussed, as has been already explained in our previous article. The weight in this instance, instead of pressing downwards upon the beam and causing it to deflect, is met and resisted at once by the upward reaction of the cast iron strut, as shown by the arrow. The strut takes the whole weight off the beam at that point, and prevents all transverse strain whatever. How, then, is any strain whatever brought upon the beam at the centre? In the first place, the strut takes the whole weight, and then the tie-rods are called into play. Suppose the weight to be conveyed down the strut to the point C. Obviously, if there were no tie rods, the cast iron strut would be of no use, as it would simply be an appendage to the beam and deflect with it. But directly the beam tends to deflect, the strut pulls upon the tie-rods in the direction of the arrows, which cause the vertical reaction which prevents the beam from deflecting. The weight is thus transferred from the beam to the strut; and by the strut to the tie-rods. What becomes of it then? The tie-rods in their turn pull upon the ends of the beam at A and B, transfer their strains to those points, and produce compressive strains in the beam indicated by the arrows pointing towards the weight at the centre. If the arrows be supposed to represent forces, then either of these arrows is equal to that pointing vertically downwards in fig. 1. In the former case, the forces represent strains of longitudinal compression, in the latter transverse strains. It must be carefully borne in mind that there is no transference of weight without strains resulting from the operation. Thus, in fig. 2 the transference of the weight at the centre to the ends of the beam produces strain upon all the parts or members of the truss through which it passes, and which, in fact, act as the medium of its conveyance. Whatever number of parts or different members the weight may affect, it will ultimately result in a vertical reaction at the abutments. The method of arriving at a determination of these strains will be demonstrated as we proceed.

It has been already stated and proved that the strength of a beam is directly as the depth and inversely as the span. Consequently the greater the depth the greater the strength, and it is at once readily perceived that one effect of trussing a beam is to increase its depth at the centre. This can be observed by comparing figs. 1 and 2. The general



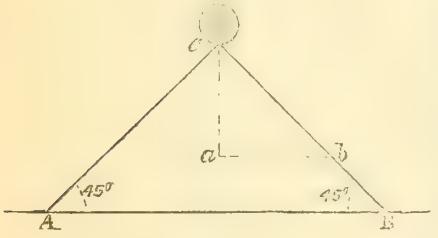
formula for the breaking weight of any beam loaded at the centre is given by the equation $W = \frac{B \times D^2 \times C}{L}$. Referring to the diagrams, the value of D in fig. 2 could not be less, practically, than double that in fig. 1. Calling this depth D^1, we have, making D $2D$, the formula $W = \frac{B \times 4D^2 \times C}{L}$. Putting W^1 for the breaking weight in fig. 2, we obtain $W : W^1 :: 1 : 4$, or $W^1 = 4W$. Doubling the depth, therefore, gives four times the strength, although there is no necessity for actually doubling the beam, and consequently quadrupling the whole amount of material in it, but merely to truss it in the manner shown in fig. 2. What, however, chiefly increases the strength of a trussed girder is the doing away with the deflection, the great element of weakness in all untrussed beams. The great difference between the calculation of the strains on an untrussed and a trussed girder is that in the latter it is assumed that all strains act longitudinally, and never transversely. If once any member of a truss is so designed, either through ignorance or error, as to be susceptible of a transverse strain, the principle of trussed or braced framing is violated, and accidents will probably ensue. It is in structures of this description that it becomes essentially requisite to distinguish between those members which act as struts and those which act as ties. The reason for the necessity of this distinction arises from the fact that, although the strain may be the same in amount, the length of the strut or tie very materially affects it. In fig. 3, let A C, B C



be two bars or rods fixed to a beam at the points A and R, and joined by a rivet, pin, or

bolt at the point C. If a weight be suspended at the point C, it will pull upon each of the bars A C, B C, and they will be undergoing a tensile strain, and will consequently be what are termed ties, or tie-rods. The term tie-rod more generally signifies the horizontal or inclined rod uniting the rafters of a roof, but is also applicable to any rod acted upon by a strain of tension. In fig. 3, let the weight at C equal 20 tons, the angle of each tie bar with the horizontal 45°, and let it be required to determine the strain upon each tie A C and B C. Since each bar makes an equal angle with the horizontal beam A B, the half of the weight is transferred to each point A and B, and consequently the strain upon each rod will be the same. This strain may be found both by geometrical and trigonometrical analysis. By the former, make in fig. 3 C a = 10 tons on a scale of ten tons to one inch, draw $a\,b$ parallel to the horizontal line A B to meet the tie at b, and C b measured on the same scale will give the strain on the tie A B or B C, and will be found equal to 14·142 tons. Similarly, the line $a\,b$ will give the strain upon the horizontal beam A B at the point A or B, and is equal to 10 tons, since the angle between the ties and the horizontal is 45°, or what is called one to one by artisans and mechanics. The same result may easily be arrived at by the aid of trigonometry. Let S = the strain to be determined either upon A C or B C, W the weight, and θ the angle made by the ties and the horizontal, then in the triangle C $a\,b$ we have C a = $c\,b$ × sine C $b\,a$. But C a = W, C b = S, and angle C $b\,a$ = 45°. Substituting these values, we have $W = S \times \text{sine } 45°$ or $\frac{S = W}{\text{sine } 45°}$. Bearing in mind that $\text{sine } 45° = \frac{1}{\text{cosec. } 45}$ we may by inversion write $S = W \times \text{cosec. } 45° = 10 \times 1{\cdot}4142 =$ as before 14·142 tons. So for the strain upon A B, or $a\,b$, the equation is C a = $a\,b$ × tang. C $b\,a$. Making the same substitution as before, W = S × tang. C $b\,a$, and since tangent of any angle is the inverse of the cotangent, we may write the equation S = W × cotang. θ, or S = 10 × 1 = ten tons, as already found.

In fig. 4 is represented the reverse case,



in which the bars are not ties but struts. The weight being situated on the top of the bars A B, B C, evidently tends to thrust them apart instead of drawing them together, as in the former example. Both the bars in this case are subjected to strains of compression, and are called struts. If the weight of ten tons be plotted in the diagram, and made equal to C a, the resulting strains upon the bars will be precisely the same as those already found. It is here that practice modifies theory. It is evident that the length of the tie-bars A C, B C, in fig. 1 have nothing to do with the strain, which only tends to stretch them in the direction of their length, and it matters nothing, within reasonable limits, whether they be long or short. But in fig. 4 manifestly the effect of the weight is to cause the struts A C, B C to bend, and their liability to do this is nearly directly as their length. It is for this reason that all struts should be made of a form or section that will best resist this bending action. Having now explained the general principles which govern the strains upon ties and struts, we shall postpone for a concluding article the application of those principles to the particular example of the trussed girder we have selected for illustration.

NATURE AND ART IN THE SISTINE CEILING, ROME.

It is quite certain that in some future age —it would be difficult, perhaps, to say when—it will be a matter of no small interest to find out what the art value of every age really and truly is, and then to employ thankfully what it produces, and to select the very best and highest it does so produce for its most important and public works. This has, indeed, in old times been done, and the proof of it will be evident to anyone who will be at the pains to study the works of the great masters of art, Michael Angelo and Raphael, as such work is seen in the buildings which as a whole make up the Vatican, Rome. Under the Pontificate of that vigorous ruler of the Church, Pope Julius II., to whom the world owes a tremendous debt of gratitude, it came to pass that some of the buildings of the papal palace wanted "decorating," and he—so different from things nowadays—went to work in quite a simple and obvious way to get it done. He first looked about him to see whether he had any competent artists, by inspecting their own works, and then, having found them, he did not, as we do, put himself into communication with a second, and perhaps mere official person, still less a mere tradesman, but actually had the courage and boldness to apply direct to the artist himself, and so to put him personally to the work to be done. Fortunately for the world, this was what he did with Michael Angelo Buonarroti, the painter of the Sistine ceiling, or we should certainly never have seen it; and the thought strikes everyone, What a contrast this is to the system pursued to-day in the cases of such places as S. Paul's Cathedral and Westminster Abbey. How different are our official magnates to Pope Julius. Who would ever believe—who in the future will believe it—that in an age like the present, when great buildings like S. Paul's and Westminster Abbey call for "decoration"—*i.e.* "painting," that there should be such painters in existence as Holman Hunt and Millais, yet that they should be passed by and all end in a mere matter of manufacture and business? Yet, most unhappily for us, so it is, and it hence becomes a matter of no small interest to find out what it was which the old painters did, so that there is in truth no subject in art more interesting than the finding out this really vital and essential thing which calls for attention everywhere, and particularly as it bears on public buildings and their decoration. No one can possibly go into any public building in London and look at the "decorative" art in it without the consciousness that all the "decoration" is a mere matter of trade and contract like the bricks and mortar of it, and that the same decoration can be done anywhere and by anybody, and that when it gets a little dingy it is all brushed away as worthless, and something else put up only to come in time to the same ending. What a contrast to past ways of work, as in this famous ceiling by Michael Angelo! All these thoughts must certainly have occurred to many who have ever looked on or taken any interest in the frescoes which cover this ceiling. They made an era in art, and are things to pause at and think about, and their reproduction in Autotype enables us to see them as they really are. The ceiling of the Sistine Chapel is 132ft. in length by 44ft. in breadth, and the height of it from the floor of the chapel 68ft. It was painted wholly by M. Angelo with his own hands between the years 1508-12, during the Pontificate of Pope Julius II. Nothing can possibly surpass the magnificent way in which the whole of it is painted, and the mastery with which the idea is carried out, and it would be impossible for any artist to employ time and study better than in the humble attempt to understand and appreciate it. In the first place, then, to help to do this it will be found that there is some additional clearness of conception to be got by the adoption of a somewhat new mode of getting at the full meaning of the work, and the story executed and told by the great painter on it, from that most usually adopted. The whole ceiling will on careful analysis be found to clearly divide itself into distinct classes or orders of subjects—viz.:—First, the purely architectural forms and divisions into panels and lunettes, divided from each other by painted mouldings and ornamental details. Secondly, the whole series of human figures which form part of this purely architectural section of the ceiling. Thirdly, the series of paintings or subjects in oblong panels, nine in number, which represent the Genesis of Creation and the story of the Fall of Man, together with the small circular panels, ten in number, which help to illustrate that story, and which, with the four lunettes in the corners of the ceiling, complete this division of the work. Fourthly, the series of great prophets and sibyls, twelve in number, with their attendant genii, who ponder over the past and future of human existence; and last, the long series of Holy Families, twenty-two in number, which represent the genealogy of Christ from Joseph to Abraham.

On the end wall of the chapel is the picture of the "Last Judgment;" and on the opposite wall it was the intention of the painter to embody the "Fall of Lucifer and the Rebel Angels." The whole of the architectural forms, mouldings, and panels are painted on the flat surface of the ceiling in the style and manner of the Renaissance which prevailed in the time of the painter. These forms are drawn in perspective, so as to show, when seen from the floor of the chapel, as raised and solid forms; the ceiling being simply a plain and flat arc of an ellipse—a sad defect every way, but with it the painter had nothing to do. These architectural forms divide the whole ceiling into panels of various shapes and sizes, and separate the paintings one from the other. Thus far the purely architectural portion of the ceiling and it is surely a subject not a little interesting to architects.

The next human forms which go to make up the architectural embellishments of the ceiling, but which have nothing to do with the story told on it, are a series of nude human figures, which, with the mouldings, help to divide the centre panel paintings one from another. They represent the human form in almost every variety of attitude; they recline opposite each other, and it seems a pity that they were not made in some way or other to help the story told on the ceiling. Each figure is a great study in itself, and the force and life in the whole are truly wonderful.

The next figures, purely architectural in their significance, are the groups of twin boys which stand on either side of the prophets and sibyls. They stand on pedestals, and support with their hands and on their heads the architrave and cornice which runs all round the ceiling, and at the same time they form, as it were, the sides or arms of the seats or thrones on which the prophets and sibyls are seated. Beneath the footstools under these seats, and supporting panels with the names of the prophets written on them, are also youthful figures of boys and girls, completing the lower portion of each lunette. The only remaining figures which can be considered as subservient wholly to this purely architectural use are those in the triangular spaces formed by the cornice, pedestals, and the outer curves of the pointed arches which enclose the Holy Families. They are naked human figures in almost every variety of attitude and posture; some of them are demoniacal, and would seem to have been intended by the painter to refer in some obscure way to the prophet or sibyl near whom they are. May they not here and there embody the principle of Evil?

These complete the purely architectural and sculpturesque portion of the ceiling. The story of it now begins—the progress and triumph of Theocracy. There are nine oblong panels down the centre of the ceiling, with paintings representing the Creation and Fall of Man. On the first panel is the sublime figure of the Creator or Eternal Word, in human form, dividing light from darkness, and embodying the passages in Genesis which describe it.

On the second panel is the Creator, surrounded and supported by angelic forms, creating the sun and moon. The magnificent retiring figure embodying the creative energy was doubtless intended by the great poet-painter to embody the idea in the verse closing with the words, "and He made the stars also." This sublime form is generally thought to represent Chaos retreating from the Divine presence, and by others to indicate a second act of Divine power in the creation of herbs and trees, but the first supposition would seem to be truest to the vastness of the idea.

On the third panel the form of the Almighty, surrounded and borne up by angels, and enveloped in a cloud of drapery, is shown as brooding, or hovering, over the surface of the waters, and as calling into existence by His will the living creatures that are to move in it. The fourth panel shows the creation of Adam: God, surrounded by angelic beings, bestows life by a touch from His finger. On the next panel is the creation of Eve, the mother of all living. On the sixth panel is drawn the Temptation of Man, and the driving out of Paradise consequent on his fall. The seventh panel shows the sacrifices of Cain and Abel. The eighth panel the Flood, and the Sacrifice of Noah; and on the ninth and last panel is represented the drunkenness of Noah, and the sin and malediction of Ham, the first transgressor after the Flood—a purely Biblical idea of the creation of the world. The next paintings, four in number, are in the corners of the ceiling, and represent the punishment and death of Haman, David and Goliath, Judith and Holofernes, and the Brazen serpent, typical of the future redemption of man. Thus are completed the series of pictures which tell the story of God's creative providence and personal rule on earth. It is the grandest connected story ever told by painting. We come now to the prophets and sibyls which surround the chapel. They are twelve in number. They prophesy of the coming of a future King and Redeemer—the prophets on the part of the Children of Israel, and the sibyls on the part of the Pagan world. Their names, in the order in which they come on the ceiling, are:—Jonas, Jeremiah, with the attendant angels or genii of the Past and Future, mourning over the desolations of his people; the Persican sibyl, reading from a book of the mystic philosophy of the country in which it is supposed she prophesied; Ezekiel, who has put aside the roll of his prophecy to listen to the whisperings of the attendant angel at his side. In the roll, written within and without, are the woes of which he prophesied. The next in order is the Erythræan sibyl, to whom was given an insight into the fall and revolution of kingdoms; Joel, reading from a roll of that day which cometh as a day of darkness and of clouds. Next in order comes the prophet Zacharias, directly opposite the Jonah, a gigantic form reading from an open book; the attendant genii, as beautiful boys, are also reading from it. This is followed by the Delphic sibyl, a grand female form, holding the prophetic roll. The next is the prophet Isaiah, with inspired look, and with upraised hand, holding a book, with the genius or spirit of futurity by his side. If the prophetic spirit of other prophets was gloomy and dark with images of woe, that of Isaiah was brighter and fuller of an assured hope:—"Comfort ye, comfort ye, my people; make straight in the desert a highway." The Cumaen sibyl, with opened book, reads out of it of a great future in scattered and obscure fragments. The prophet next in order is Daniel; he is transcribing from a volume borne on the shoulders of an attendant genius. The last of this great series of prophetic forms is the Lybian sibyl, throwing back the book of her prophetic lore, and hastening to tell of what it contains of the Future. The great debt which the world of art—indeed, the world everywhere—owes to Michael Angelo in bestowing on it this gift of the grand representations of these prophetic and inspired forms is enhanced by the fact, patent to all, that no other man has ever been able to realise in palpable and visible form the idea we get of the great Hebrew prophets from the words which they uttered. All other painters have fallen below their proper proportions. M. Angelo has realised them, and we can, through the might of his mental energy and the power of his brush, see the prophets of Israel.

The sublime conception of the Lybian sibyl closes the series of the prophets and sibyls, and the idea of the painter, in so far as the obscure Past and unknown Future formed an integral part of it. The rest of the ceiling is filled up with the series of Holy Families, twenty-two in number. They occupy, in sets of threes, the spaces over the windows of the chapel, and are intended to illustrate the genealogy of Christ, as told by S. Matthew, from Abraham to Joseph. Nothing can surpass the beauty and human interest to be found in this series of drawings and compositions. They complete the idea embodied in the ceiling—viz., the progress and triumph of Theocracy.

These paintings are the greatest, and fullest of thought and inspiration, in the world; and the interest that is now to be found in them is increased by the fact of it being possible, through the autotype process, to see them as they really are, and not as commonly to be seen through the eye of an engraver, however able he may be. We can now see them line for line, and touch for touch, and can realise to ourselves their wonderful power and force, and become through them acquainted personally with him who brought them into being—Michael Angelo Buonarroti. So many theories have been hazarded by artists and writers on art on the way in which these tremendous creations were given to the world, and so many opinions as to the precise character of the mind of the artist who did the work, and as to whether he owed anything at all to external nature in the accomplishment of it, or drew wholly from his own inherent greatness of mind and power of invention, that I trust to have another opportunity to comment upon it, merely premising that this slight sketch of the Sistine ceiling may prove of some small value to many who have not given it special attention, and tried, as is here done, to analyse its several component parts. For our instruction was it written by the sublime painter of it, like the texts in the Bible which it illustrates, and it is worth some trouble to understand it well.

C. B. A.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

At the Ordinary General Meeting, held on Monday, 30th May, 1870, Mr. E. I'Anson, V.P., in the chair, the following members were elected—Mr. Charles J. Adams (Associate), as Fellow; and Messrs. Charles Bell, William B. Colling, Ralph Nevill, and Charles S. Whitley, as Associates.

Some correspondence which has passed between the Council and the Royal Commissioners for the International Exhibition of 1871, together with a letter proposed to be addressed to Mr. A. J. B. Beresford-Hope, M.P., on the same subject, was next submitted to the meeting. From a statement made by Professor Donaldson, it appears that the list of Commissioners for the approaching exhibition does not include the name of the President of the Royal Institute of British Architects, although the Presidents of the Institution of Civil Engineers, the Geological Society, and the Royal Academy of Arts are included in the list. The Council had therefore taken action in the matter, and the hon. secretaries had written to Earl de Grey, asking whether there would be any objection to add the name of the President of the Institute to the list of Commissioners, as upon that point would depend the co-operation which the Institute would be able to give in the undertaking. In reply to this, a letter was received from Earl de Grey, stating that the proposed annual exhibitions are to be carried out by the Commissioners of the Exhibition of 1851, whose charter only stipulated that the Presidents of the Institutions named should be placed on the list of Commissioners. At the same time, the Commissioners "would hope to have the assistance of the Royal Institute of British Architects on matters of architecture." As this reply appeared to the Council to be an evasion of the question, a similar letter was next written to Lord Granville (through Mr. Beresford-Hope). In reply to this, Lord Granville wrote to Mr. Beresford-Hope, saying that although he had taken so little part in the proceedings of the Commissioners of late that he could not take upon himself to press them to reverse their decision, he had had some conversation with the Prince of Wales, who was of opinion, with him, that the Commissioners would gladly welcome Mr. Beresford-Hope and Sir William Tite as permanent Commissioners. This was felt to be an evasion also, because what is required is that the President *ex officio* should be a Commissioner, and for this two ex-Presidents were no fair substitute. Therefore the Council had directed a letter to be drawn up and sent to the Commissioners through Mr. Beresford-Hope, and this letter was now submitted for the approval of the meeting. The letter was to the effect that the members fully appreciated the kindness of the Prince of Wales in being willing to adopt the suggestion of Lord Granville to place Mr. Beresford-Hope and Sir William Tite on the commission, yet as there seemed to be no disposition to place *ex officio* the President of the Institute in the same position as the Presidents of other scientific and artistic societies named on the Commission, the Institute, representing the profession of architecture, felt themselves precluded, on account of this marked omission, from taking part as a body in the International Exhibition of 1871. Professor Donaldson remarked that, by taking this course, the individual freedom of members of the Institute as to contributing to the Exhibition, was not interfered with.—On the motion of Mr. C. F. Hayward, seconded by Mr. Wyatt Papworth, the action of the Council was confirmed, and the letter approved. It was incidentally stated that the Commissioners had appointed Committees of two members each for the three arts—painting, sculpture, and architecture, and that Sir W. Tite and Mr. Beresford-Hope had been appointed the committee on architecture.

Mr. W. Emerson, Associate, then read a paper "On the Taj-Mahal at Agra," which was followed by the reading, by Mr. Seddon, of a short description of a painted scroll found in Chelmorton Church, by Mr. Fairless Barber.

How to Seat Iron Columns.—The crushing and breaking of cast-iron columns is not an uncommon occurrence, and is usually accompanied by loss of life and property. Such accidents are not unusually attributed to poor iron or too great pressure, but are in reality most frequently due to the improper seating of the columns. The common method is to take the columns just as they come from the foundry, and set them up on a rough base, the open spaces being filled with lead, which is a more compressible material than the iron. This throws upon the rough projections of the base the whole weight that the column has to support. These projections are in course of time driven into the mass of the column, and, acting as wedges, force the granules of metal apart, a process which is accelerated by vibrations and sudden changes in the amount of load. Fracture and accident are the inevitable consequences. To set up iron columns in a safe and proper manner, the bases should be turned off true in a lathe, and the surface on which they rest should be dressed, so as to give an even bearing over the whole surface of contact. If proper attention is given to this matter, iron columns may be relied on to sustain the maximum of weight; while, if the ordinary practice be followed, proper confidence can never be placed in them.

The Surveyor.

NOTES ON THE INCLOSURE ACTS AND THEIR RESULTS.*

IN the following notes I do not propose to trace the history of inclosures back to any remote period, but rather to dwell upon the more recent Acts of Parliament relating to the subject, and the improvements and advantages which have resulted from inclosures carried out under my own observation, and within my own recollection.

Without entering into any description of the numerous rights over lands to which the Inclosure Acts apply, the bulk of such lands may be briefly described as wastes of manors, or as commonable lands which are held in severalty during certain seasons, and are at other times subject to the exercise of various common rights.

It is hardly necessary to point out that such lands must be very much more valuable to the various persons interested in them when the rights of such persons have been ascertained and commuted into the form of an allotment, held in severalty, or, in other words, when they have been inclosed and allotted.

Inclosures have been effected either by means of an agreement between the lord of the manor and the commoners, or by an Act of Parliament. The first process has seldom been resorted to, on account of the difficulty in obtaining the unanimous consent of the parties, and also because it must generally happen that some of them are unable to give a legally binding consent. The other process has therefore been more generally adopted, and up to the beginning of this century about 1600 Private Acts for Inclosures had been passed.

The cost of each Act, and of the machinery for putting it into execution, was so great, that, in the year 1800, the attention of Parliament was directed to the subject, and a series of resolutions agreed to by both Houses.

By these resolutions it was proposed that affidavits to prove the notices, consents, and allegations contained in the preambles of Inclosure Bills should be admitted instead of parole evidence; that a general law, containing provisions to which all Inclosure Bills might refer, should be passed, and a similar law for taxing solicitors' charges, regulating the conduct of commissioners, and preventing delays; and that the fees payable to the Houses of Parliament, on the various stages of Private Bills, should be reduced.

In the next Session (1801) a Bill was introduced into the House of Lords, and another into the House of Commons, and the latter, which was brought in by Sir John Sinclair, was passed.

It was entitled "An Act for consolidating in one Act certain provisions usually inserted in Acts of Inclosure, and for facilitating the mode of proving the several facts usually required on the passing of such Acts" (41 Geo. III., cap. 109.) The preamble set forth that its object was to reduce the expenses of passing Inclosure Acts, and the clauses provided for the appointment of Commissioners, and the performance by them of the various duties necessary to carry such acts into execution.

By this measure affidavits were substituted for parole evidence, and general clauses were provided to which Private Bills should refer; the Act, however, established no control over the proceedings, or the costs and delays, of inclosures which appeared to be one of the chief objects of the resolutions. It is curious to observe that, in the Bill which was introduced into the House of Lords, this important point was not lost sight of, as a Board of Commissioners was proposed to superintend and control inclosures.

The General Inclosure Act was a step in the right direction, but, as in every individual case, a special Act was still necessary, the expense was in most instances very great, and entirely prevented the inclosure of the smaller and less valuable commons.

The fees, although reduced in accordance with the resolutions, were seldom less than £250 or £300, exclusive of the solicitors' and parliamentary agents' costs for obtaining and proving the assents and dissents, and promoting the Bill. Thus from £500 to £1000, and, in opposed cases, sometimes as much as £1700, were frequently expended before the actual business of the inclosure began. From this cause the inclosure of many commons, although approved by the majority of those interested, was prevented by the fear that some litigious person might, at the last moment, get up an opposition to the Bill, which would materially increase its cost.

It had been found somewhat difficult to substantiate appeals against the awards made under Inclosure Acts, and it was therefore customary, in order to satisfy the three principal interests involved, viz., those of the lord, the tithe-owner, and the commoners, that each should name a commissioner. This custom tended very much to increase the cost, as one commissioner might have performed the duties alone.

The numerous inclosures carried out during the early part of this century, were mostly those of open common fields, and the more valuable commons. The price of corn and the value of land was then very high, and the expenses were therefore of less consequence than they became when those prices fell.

In looking over the papers referring to inclosures in which my father acted, either as commissioner or surveyor, from the beginning of the century up to the year 1815, and also some in which I was engaged before the year 1836, I find that the cost of dealing with some 17,000 acres, in twenty-two cases, averaged nearly £3 per acre.

These were, with two exceptions, inclosures of common fields, and in every case a considerable quantity of land was dealt with. The costs may be approximately divided into three equal parts, viz. :—

The Act of Parliament and solicitors' costs	£1 per acre.
Roads and fencing	£1 ,,
Commissioner, surveyor, and other expenses	£1 ,,

Inclosures of waste lands were generally more expensive, the costs averaging, in ordinary cases, from £4 to £6 per acre; and in those of small commons considerably more.

In the evidence before the Select Committee of 1844, the Chamford Forest Inclosure, on which £70,000 were expended to inclose 12,000 acres, was alluded to. In another case an opposed Bill to deal with 2000 acres cost £1728, and the whole expense, including that item, was £8128. £1000 were spent in a case of 85 acres of valuable waste land, of which sum £337 was the cost of the Act.

It was therefore impossible to inclose small commons, unless they were very valuable; and, as the late Mr. Blamire observed in his evidence before the same committee, there were, doubtless, instances in which not only had the whole of the land been sold to pay the expenses, bnt the persons interested had, in addition, saddled themselves with the repairs of expensive roads.

The want of some controlling power was much felt. In numerous cases the process dragged on for years, and in others, from some difficulty which arose in the course of the proceedings, no award was ever made, and the allottees consequently possessed no title to their allotments. The late Mr. Blamire stated that he had heard of 100 such cases. One, affecting some 40,000 acres, was particalarly alluded to, which, though commenced at the beginning of the century, had never been completed. The neglect of forms also rendered the legality of many awards doubtful.

In the year 1821 a short Act (1 and 2 Geo. IV., cap 23) was passed, mainly for the purpose of enabling allottees to recover the rent of and protect their allotments, although the award of the commissioners should not have been completed; and in 1833 two Acts were passed—one (3 and 4 Wm. IV., cap. 35) providing for the recovery by the commissioners of rates which might be made after the completion of their awards, and the other (3 and 4 Wm. IV., cap. 87) to render such awards legal, although they had not been properly enrolled according to the statute.

We then come to the year 1836, when Mr. Anderson Pelham (afterwards Lord Worsley) introduced a Bill to facilitate the enclosure of common fields, and render the process less expensive. It received the Royal assent in the same year after some considerable discussion, and is known as "The Common Field Inclosure Act" (6 and 7 Wm. IV., cap. 115). Its main object was to obviate the necessity of a special Act in each case; and it provided that two-thirds parts, both in number and value, of the persons interested in any common arable field, or common meadow, might consent in writing to an inclosure, at a meeting to be called for the purpose of considering the matter, and at a subsequent meeting appoint a sole commissioner, or two commissioners with an umpire, to carry it out. It also provided for inclosures without a commissioner, if seven-eighths in number and value of the persons interested entered into an agreement for the purpose at a public meeting, such agreement to be subject to final appeal to the Quarter Sessions within six months.

The commissioner having been appointed, proceeded, with the assistance of a clerk, to hold meetings to receive and determine the claims, and afterwards to set out the roads, make the allotments, and draw up the award. He had power to straighten and shorten boundaries, and could, with the consent of the lords of the neighbouring manors, set out the boundaries between them and the lands to be enclosed. Four-fifths of the persons interested could, at a meeting, agree on the adoption of any map to be used for the purposes of the inclosure, and give special instructions to the commissioner. These proceedings were all subject to appeals either to the Quarter Sessions or the courts of law.

This Act did not authorise the inclosure of any waste land, and it was not to affect the rights of lords of manors, except in respect of anything for which compensation was made.

It is somewhat curious that the provision for the protection of the smaller proprietors, enacting that the fixed proportion in *number*, as well as in value of the persons interested should determine on the inclosure, was introduced by the House of Lords, who also inserted the clause preventing the application of the Act to land within certain distances of large towns.

There were, however, many objections to the Act of 1836, of which, perhaps, the chief was that it omitted to deal with waste land. This circumstance occasioned much inconvenience, because small pieces of waste were frequently found intermixed with open common fields. In many instances these were actually dealt with, thus placing in jeopardy the legality of the award and the title of the allottees. Mr. Higgins, in his evidence before the committee in 1844, mentioned an inclosure under the Act, in which he had been requested to inclose such a piece of land together with the common fields, and had been indemnified by the persons interested for carrying out their wishes. The Act could not be applied to the cases of common fields, over which general and unlimited rights of pasturage by the inhabitants of a town, or by the householders in common with the owners, existed, because it was held that a legal title to such rights could not be shown, and that they were only exercised by usage. Such a case existed at Newbury, which it was found could not be dealt with under the Common Fields Act.

On reference to nine cases under the Act of 1836 in which I acted as commissioner, between the years 1836 and 1844, I find that about £10,500 were expended to enclose 5500 acres, or about £2 per acre, one-half of which was the cost of the new roads.

From the date of the passing of the Act of 1801 up to 1836, about 1920 Private Acts had received the Royal assent, but from 1836 to 1843 scarcely 100 such Acts were passed.

In the year 1840 another short Act was passed (3 & 4 Vict., cap. 31,) to render the execution of awards by the commissioners conclusive evidence that the provisions of the Acts had been complied with, so as to establish the title of the allottees.

It provided that persons proceeding to inclose and cultivate their allotments should be considered to have waived their right to appeal, and extended the powers as to setting out boundaries. It also provided for the inclosures, under the Act of 1836, of tracts of grass land commonable during part of the year only, and held in severalty for the remainder in cases in which such tracts were adjacent to common arable fields.

For several years before 1843 the Tithe Commissioners had been carrying out the duties entrusted to them by the Legislature, and the success which attended their labours probably suggested the idea of a somewhat similar controlling power to superintend inclosures.

In 1843, Lord Worsley introduced a measure with this view, but it advanced no farther than a second reading. Previous to this year the question of dedicating portions of waste land for recreation grounds for the inhabitants had received consideration, and a regulation to this effect had

* Read at the Ordinary General Meeting of the Institution of Surveyors, May 23rd, 1870, by RICHARD HALL, Vice-President; John Clutton, President, in the chair.

become one of the standing orders of the House of Commons. In the debates on Lord Worsley's Bill, this subject, and also that of allotment gardens, were discussed, and the measure encountered some opposition, on the ground of the undesirability of depriving the public, and especially the poorer inhabitants, of the advantages of commons near their dwellings.

(To be continued.)

ON THE PROGRESS OF ART, AND THE PROBABLE CAUSES OF THE GREEKS' PRE-EMINENCE IN ITS PRODUCTION.

By H. C. SELOUS.

(*Concluded from page* 399.)

IT is to be regretted that the greatest sculptor our era can boast of, that grand artist, Michael Angelo, never saw the works of his great predecessor. In Michael Angelo's young days, when his restless spirit was constantly employed in seeking food to satisfy the cravings of his towering mind, events happened that produced lasting effects upon his future ideas. That noble Torso, supposed to be a Hercules, and more generally known as Michael Angelo's Torso, together with the grand statue of the Laocoon, had just been discovered, and released from the dust that had hidden them for ages. All Rome was in a ferment of delight. Different in style from most of the antique statues the Romans already possessed, they charmed by their vigour of muscular display, and were pronounced the finest relics of antiquity in existence. Judge, then, of the effect they must have produced upon the congenial, restless, energetic, and exalted notions of Michael Angelo. He avowed them to be henceforth his models and his guides; and, with the unquenchable fire of his genius, burned to equal, if not to surpass, the power and vigour of the great originals. From this vain ambitious feeling sprang all the faults and all the disappointments of this aspiring genius. These great and grand works of antiquity, the Laocoon, the Torso, the Hercules Farnese, and others of the same period of Greek art, are no doubt noble objects to contemplate and to study, but dangerous to attempt to imitate, still more to surpass. Like the efforts of a great actor in the theatre, who finds he has to force the powers of voice and gesture to their utmost limit, the sculptor in these statues has, I will not say overstepped the modesty of nature, but is on the verge; and one step beyond is fatal. That step Michael Angelo took, and in the contortions of the muscles and the positions of his figures you see the writhings and tortures of a great mind in vain attempting to embody the conceptions of his mighty genius—a genius that was never satisfied. He scarcely ever produced what might be called a finished or perfect work. It is curious to consider what would have been the result had it been the good fortune of Michael Angelo to contemplate the works of the great Phidias. In those majestic figures he would have perceived a grandeur that in vain he sought for—a grandeur that would have curbed his fiery and impetuous spirit, and taught him that repose, dignity, and truth to nature are the perfection of an art, and the things essential to the production of what we are almost tempted to pronounce (when looking at these Greek masterpieces) divine grandeur. When before the works of Michael Angelo we are also impressed with a consciousness of the power and grandeur in the figures we gaze at, but they bespeak a fevered restlessness, and almost a painful one. You see too plainly the labour that has freed them from their marble tombs, and too strongly the impress of the tools that turned the marble into flesh; but its stony nature hangs still on it, and you cannot for a moment fancy such forms could ever be endowed with life. How different is the feeling when you contemplate the immortal works of Phidias! It is a living mortal, or a god transformed to stone—flesh petrified. You can almost fancy you see the palpitation of the matchless bosom, or the feet gently stirring the folds of the delicate drapery that rests upon it, and you imagine that noble specimen of perfect nature, the figure of the Illissus, may again rise up, instinct with life and motion. This is indeed grand art, and from the study of nature alone did the Greeks arrive at the exalted pre-eminence that enabled them to produce those faultless specimens of the human form that were worthy of the noble temples erected for their reception, which latter were unlike the temples of other nations of antiquity, where the outside was generally little more than a bare wall, and in the interior of which you wander through vast labyrinths of painted columns and open courts, and look in vain for the object of adoration they were erected for, till at length, in the likeness of a bull or a big-headed monster, you detect the god the people were degraded enough to worship. Not so the temples of the Greeks. Formed of the purest marble, enriched on the outside with the most exquisite specimens of their varied skill in sculpture, surrounded with noble columns of massive grandeur, proportion and simplicity, they glistened in the morning sun like an elaborately carved ivory shrine. No useless ornament to interfere with or disturb the solemn sanctity within, where, in solitary silence and partial gloom, the majestic form filling all the place in seated dignity and repose attests the awful presence of the god. Unlike the Egyptians, Assyrians, and other nations, they abstained from metamorphosing or disfiguring the upper portions of the human figure, particularly the head. There is only one instance that I am aware of where this rule was departed from, and that was in the early history of their art. When they represented the fabled monster, the Minotaur, it was always shown with the bull's head, but in no case was it done to represent a deity. Thus we have still beautiful conceptions—the Centaur, the Sirens, the Tritons, sea nymphs, and many others, and even Medusa herself is still depicted with a lovely face. Intense love for the beautiful in form and feature became then, it would appear, an almost devotional feeling with the Greeks, and not a sensual one, as we might naturally suppose. Indeed, their intellectual pleasure was so great in contemplating beauty that it invested with a sacred character those grand works of art that adorned their religious edifices. The only accusation against the sculptor Phidias, and for which he was condemned to die, was that he had introduced his own portrait on the shield of his celebrated statue of Minerva. There is little doubt that the Greek artists had one great and important advantage over other nations of antiquity—one that was of the greatest assistance to them, and the principal cause of their arriving at the high state of perfection they attained in art. It was their great personal beauty as a nation, and particularly that of their women. The ancient story of Helen and the Trojan War points to the conclusion that the maritime Asiatic nations were large traffickers in female slaves, and Greece was then the great mart of feminine beauty; and the ancient tradition—the foundation of the oldest and greatest poem in existence—that tells of a whole nation undertaking a ten years' war to repossess themselves of the reputed most beautiful woman in the world, is a fit poetical expression of their feeling and admiration for the beautiful—a feeling we, as a Northern nation, unfortunately cannot possibly understand or appreciate. From this intense admiration and intellectual love for the beautiful sprang all the talent and supremacy of the power they displayed in endowing with grace and elegance everything they created. Dress, then, naturally would now require their attention—how to clothe their idol beauty so as not to hide or disfigure the lovely form, but to display it to the best advantage. Wonderful workers in metal, their whole skill was employed in forming adornments for the human body, and the production of those beautiful specimens of almost warlike habiliments, their noble helmets, their elaborate shields, and graceful breast-plates, formed to suit the motions of the human body, attest their power, and every variety of feminine personal ornaments were formed with such perfection of design, such admirable execution, that they still remain the wonder, the despair, and the model of our modern gold workers. Yet everything was made subservient to the figure. Their finely-textured fabrics rested upon it with a delicacy and grace and a tenderness that seemed to fear to injure its charms by too rough a contact, yet hung in decent folds down to the ground. How different it is with modern nations, who, with senseless reason, force and compress the body into forms and dresses that they take upon themselves to consider beautiful. Mr. Selous here dwelt at some length on the injurious effects of modern fashions in costume, such as tight-lacing, upon the health of our female population, to say nothing of the artistic objections to such fashions, and concluded by saying that one important consequence of the extreme anxiety for and love of beauty in form that the Greeks possessed so strongly was the endeavour by every means in their power to ensure beauty, strength, and vigour to their offspring. There cannot be a doubt but that they succeeded, and the Greeks, as a people, must have been at their best time the finest specimens of our race that ever trod this earth, so that, as art progressed, there were never wanting models of matchless beauty for the artist to look up to. Thus cause and effect constantly reacting on each other, the Greek sculptor became so perfect in his art by the acquirement of such consummate knowledge, joined to such a delicate appreciation of what is grand, beautiful, and true, by his constant study of nature's highest efforts to produce matchless examples of the human figure, that at length appeared, from the giant hand and brain of the immortal Phidias, those specimens of the human form that adorn that glorious and perfect work—the Athenian Parthenon. Art can go no further than is exemplified in that wonderful building. It may be equalled, but never can be surpassed. I have thus endeavoured to show that the Greeks were the destined people to discover the secret cause and foundation of what is beautiful and true in art, and to hand down inimitable art laws for all nations now and for ever. They have fulfilled their allotted task, and have now, like other nations, faded into the gloom and mystery of the past. But their mighty mind and towering genius still lives with us on earth in those grand works left for our delight, instruction, and contemplation, and in that contemplation never let us forget that they were the first to perceive, accept, and feel the sublime idea that God created man in his own image.

BUILDERS' BENEVOLENT INSTITUTION.

A GENERAL meeting of the subscribers and friends to the above charity was held on Thursday, the 26th ult., at Willis's Rooms, King-street, St. James's, to elect two pensioners on the funds—one male and one female—from a list of twelve candidates. The chair was taken by Mr. J. M. Macey, the President.

The CHAIRMAN referred to the condition of the funds, which then enabled them only to select two pensioners from a list of twelve candidates. He was aware that many builders and persons connected with the building trade did not subscribe to the institution, which he thought might be owing to the general depression of trade. He trusted that in future there would be increased subscriptions, so that a greater number of candidates might become recipients of the benefits of the institution.

The poll was then proceeded with, and at its close the following were declared duly elected:—

Richard Burdett, Molyneux-street, Edgware-road, a painter and plumber, aged 73. Martha A. Martin, Great Pulteney-street, Golden-square, aged 72; widow of a plumber, who is very infirm, and earns but little by her needle. She received from Morley's Charity £8 4s. 6d. per annum.

On the motion of Mr. Simpson, seconded by Mr. Thorn, a vote of thanks was accorded to Mr. Cozens and Mr. Stirling, for the careful and efficient manner in which they performed the arduous task of scrutineers.

Mr. Joseph Bird sympathisingly addressed the unsuccessful candidates, and urged them not to relax their efforts in obtaining as many votes as possible for the next election, when he hoped the subscriptions would have greatly increased. The candidates must at length be elected, as their votes were brought forward from time to time.

The proceedings then concluded after the usual compliments.

BROUGHTON FOOTBRIDGE.—The ceremony of opening the new suspension footbridge which has been erected at the foot of Hough-lane, between Broughton and Peel-park, Manchester, took place on Saturday afternoon. The bridge is 135ft. in length, but the entire length of the structure is 240ft. The footway is 6ft. wide, and the ironwork, of which there are some 20 tons, rests upon two stone piers, while the chains are attached to anchors of considerable weight on each bank of the river. The total cost of the bridge, which has been defrayed wholly out of the Broughton rates, is about £1000. The engineers are Messrs. Cawley and Newton, who supplied the plans free of cost; and the contractos for the iron work, Messrs. W. Mabon and Co., Ardwick, and for the mason work, Mr. E. Johnson, builder.

Furniture & Decoration.

ON THE USE AND ABUSE OF IMITATIONS OF WOODS AND MARBLES, &c., &c., IN HOUSE DECORATION.

RUSKIN says "there is no meaner occupation for the human mind than the imitation of the stains and striæ of wood and marble. The grainer must think of what he is doing, and veritable attention and care, and occasionally considerable skill, are consumed in the doing of a more absolute nothing than I can name in any other department of painful idleness. I know not anything so humiliating as to see a human being with arms and limbs complete, and apparently a head, and assuredly a soul, yet into the hands of which when you have put a brush and pallette it cannot do anything with them but imitate a piece of wood. It cannot colour: it has no idea of colour. It cannot draw: it has no idea of form. It cannot caricature: it has no idea of humour."

Now with all due respect for Mr. John Ruskin, and with all due deference to his service to art, we cannot help characterising the above description as a piece of the most arrant nonsense, and feel bound to protest with all our might and all our strength against such false teaching, notwithstanding the high authority from which it proceeds, the more so that there are a number of our architects and decorators who, either not having any mind of their own, or not being able to form an opinion for themselves, blindly follow their leader, and, in attempting to avoid Scylla, fall into Charybdis. They cannot comprehend the fact that even a great mind, in its search after truth, and in its enthusiastic desire to bring about a better appreciation of all that is good and true in art, may be led into error from the very intensity of its enthusiasm; but these people, having unbounded faith in their oracle, believe that everything, however absurd, which falls from his lips must be true, and consequently rush into such an extreme of Ruskinism that they prefer the most outrageous ugliness to the greatest beauty if that beauty is an imitation. Architects, from their position in society, are able to do much good or much harm in influencing the public taste; therefore it is the more necessary that such fallacies should be inquired into and dispelled. We confess we cannot perceive the meanness of being able to make a good representation of either wood or marble, if the same be well executed and in its right place. All art, of whatever kind, is imitative, and even in its highest phase, when the power of the intellect, the religious faith, or the mind of the painter may be most clearly seen in his work, he must still draw from some natural type, however much he may afterwards idealise the form and sentiment sought to be expressed, and it is a questionable point with us whether we do not in nine cases out of ten attribute sentiment and expression to a picture which the painter never dreamt of when he painted it. No two minds will read it alike. In many of our best paintings, both ancient and modern, we find imitative art wrought out with such an amount of elaboration and to such perfection that one could almost fancy the rich satins and brocades would rustle if we touched them, that the vessels of gold, silver, and bronze would ring out if struck. The landscape painter and the flower painte imitate natural objects with all the skill the are capable of, and the nearer the imitation—the more true to nature the representation is—the more pleasing and valuable the picture will be. We are puzzled to know how it can be a meanness and reprehensible to paint one class of natural objects and yet be praiseworthy and commendable to paint another class, both depending for their beauty and excellence on the nearness of the imitation to the object represented. For, in contradiction to Mr. Ruskin's dictum, we hold that no man can make a first-class imitation of marble except he has a knowlelge of form and colour. It is a comparatively easy matter to paint the representation of a round ball which shall appear to stand out in full relief according to its diameter; but if we cut the ball into two parts and try to paint it as sunk in a flat surface and to appear transparent so that we may see as it were down into its depth, we shall find it a very different matter to painting the same object in relief. Now this is exactly what the marble painter has to do—not perhaps in the form of a ball, but in all sorts of irregular forms which, to be good, must have an apparent depth and translucency which can only be got by one having a consummate knowledge of colour and form, and a large amount of manipulative skill, for the characteristic features of each marble are so distinct and peculiar, that no man devoid of a knowledge of form could imitate them. Mr. Ruskin says the grainer must think of what he is doing with veritable attention and care. We quite agree with him. If he had used a thousand words he could not have said more clearly that the imitation of woods and marbles is a work requiring thought, care, and skill in its execution, taxing the powers of the mind. Are these the particular signs of meanness? If so, what a vast amount of meanness there must be in this world.

Mr. Owen Jones (than whom there is no higher authority on decorative art, nor any man who has done so much for its advancement) says, in his "Grammar of Ornament," proposition 35, that imitation of wood and marble is allowable in all cases where the real wood or marble would be used by the architect. This opinion accords with common sense and universal practice. We believe in the great truth that the custom or practice, either in art or morals, which secures the greatest amount of comfort to the mass of the people is of the truest and best, notwithstanding the abstract views which philosophers and art critics may hold in reference thereto. The greatest and most sublime thought, scene, or action ever embodied on canvas can only have but a limited influence upon nations or peoples, simply because the expression of the painter's thought can only under the most favourable circumstances be seen by a comparatively few individuals, and when seen can only be understood by a still smaller number. But if we clothe the same thought or describe the noble action in suitable words, hundreds of millions of men of all nations and all creeds may be moved to the innermost depths of their souls by it, and be made better and happier by its influence. So it is in degree with all the lower phases of art work: its influence is wide-spread, and powerful for good, working silently but surely towards the end we all look forward to. As a matter of course we would all like to have our houses decorated with rare and beautiful marbles, exquisite carvings in wood and stone and ivory, cabinets inlaid with precious stones and gems, and silver and gold; our drinking vessels of the rarest china and the richest metals, and in the purest designs; but unfortunately this cannot be. There is one fatal objection, namely, cost. It is only millionaires who can afford such luxuries. Another objection, still more fatal, is the fact that with all the wealth the world can command there is an absence of the wealth of exceptional talent requisite to execute such works. Now, according to Ruskin, if we cannot have real marbles and real sculpture—if we cannot afford to employ the most eminent men in all branches of the decorative arts—we had better have our walls unpainted and unpapered, our ceilings without enrichments, our fireplaces without ornament, our fire-irons and railings plain bars of iron—discard all castings, whether of plaster, cement, or iron; no matter how beautiful, no matter how well designed, or how suitable to the purposes intended to serve, no matter how much pleasure and comfort and happiness and instruction they are calculated to produce; away with them, tread them under foot, discard them altogether. What right have we to enjoy spurious beauty? We must live in a barn until we can afford a palace; and if we cannot have a whole cake we had better have none.

This is the inevitable conclusion to be drawn from such teaching, and in practice its ugliness is demonstrated every day. How frequently we see private houses and public buildings disfigured with woodwork simply sized and varnished, or stained and varnished, in which there are great ugly blotches of resinous knots, many the size of the crown of one's hat, like black dabs of colour without form or beauty. If it were oak or well-chosen pitch pine we should then have a work combining beauty and utility both in grain and colour; but in the former case we have nothing but unmitigated ugliness. After all, we have one consolation, everybody soon gets tired of it' and have at last to resort to painting and graining to cover this abortion.

Many of our architects and decorators in practice are making a compromise between Ruskinism and common sense; they say, If we are to have imitations of woods and marbles we would confine ourselves to colour alone. We will have our woodwork the exact colour of oak, but plain-combed straight up and down, without any figure or dapple. If we have an imitation of marble we do not care how it is done, so that we have the colour of the marble we wish to see represented. We have seen work of this kind done by some of the leading firms in the kingdom, on which an immensity of labour has been bestowed in the preparation of the grounds for marbling and in the varnishing and polishing afterwards, while the marbling, which is really the artistic work, has been the merest daubs imaginable, without depth or transparency—of the paint painty. Now we protest most strongly against the spread of such principles, as being utterly untrue, destructive alike of all thoroughness and good workmanship. Whatever we take in hand to do let us do it honestly and thoroughly to the best of our ability. The nearer we approach our original, the closer the representation is to the marble, so much the greater is the satisfaction to be derived from its contemplation We have no objection to the use of real woods or marbles; on the contrary, we should rejoice to see them more extensively used in this country, and we are glad to see that they are being so used to a much greater extent than formerly; but, for the sake of common sense, let us get rid of the ridiculous notion that imitations are to be discarded and put down, for be assured of this, if we are to banish all imitations from amongst us, our homes and hearths will, for the present at all events, lack attractions which they might otherwise possess.

THE MIDLAND RAILWAY FROM SETTLE TO CARLISLE.—Preparations are now in active progress at the Carlisle end of this undertaking. Messrs. Eckersley and Bayliss, the contractors (who last year completed the arduous task of making the Solway Junction Railway, including an immense viaduct across the Solway Firth from Annan to Port Carlisle and Bowness), are at present busily engaged in erecting stabling, blacksmiths' shops, stores, and huts for the accommodation of workmen, who will be stationed at Scotby, a small village near Carlisle. The length over which Messrs. Eckersley and Bayliss's contract extends is from Newbiggin to Carlisle, a distance of 23¼ miles.

NEW CEMETERY AT WOOTTON BASSETT.—The Burial Board of Wootton Bassett have decided to proceed with the works at the New Cemetery, and the tender of Mr. Thomas Lansdown has been selected from among ten competitors. The extent of the Cemetery will be 2½ acres, nearly square. It is stipulated that the whole of the work shall be completed by the early part of October next. The cost will be £1030.

HOW TO BUILD A STABLE.

GENERALLY speaking, we consider bricks the very best material with which to build stables; even preferable to stone, from the fact that the walls inside, having a smoother face, may be kept cleaner, freer from cobwebs and dust deposits, than stone walls; and, if built with hollow walls, more free from dampness also. It is very desirable, however, to have a stable rat-proof; and it may be made thoroughly so by commencing with a stone foundation—the bottom course of which is broader than the stonework above it—laid in half cement mortar up to the grade line, and then building the brick wall upon that, filling in all the space inclosed by the walls with concrete up to the line of the top of the water-table, and then paving it with large stones firmly bedded, which shall form the floor of the stable. On the outside there should be a stone water-table 8in. or 10in. high, projecting 1in. or 2in. outside of the main walls above, and having the upper surface of the projection bevelled off to shed the water; and just above the water-table it would be well to have a course of slate built in the full thickness of the walls, which will prevent any dampness rising up into them from the ground by capillary attraction.

Above the water-table the walls should be built up with a smooth face, and with close, neatly struck joints inside as well as out, so as to present a clean, even surface, which should always be kept painted or washed with a lime or cement wash. Above the wall-plate the space should be filled in to the under side of the roof-boards.

The ceilings over the main story are usually left with the second story floor beams exposed to view, but we think it very desirable that they should be lathed and plastered; partially, for the sake of the wholesome, cleanly appearance a white ceiling always has, and for the sake of keeping away cobwebs, which, when beams are exposed, always get lodgment—and partially to prevent foul air rising from the room below and tainting the hay in the loft. We would also trim the doors and windows inside with architraves, even if they are only narrow strips of the cheapest stuff.

These two last hints, by the way, are just as valuable for a wood as for a brick stable.

It may be desirable, in some instances, to fur out and lath and plaster the walls of a stable, but if this is to be done, it is better to wainscot with wood up to the height of, say 5ft., and to fill in the space between the walls and the wainscot, as high as practicable, with broken glass and mortar, and then to lath and plaster from the wainscot up to the ceiling. A wooden stable, too, may with advantage be treated in the same way, but the space behind the wainscot being wider, may be packed with bricks and mortar, and made solid in that way.

We know it is not customary to put any finish of any kind upon the interior of stables, but we also know that in nine cases out of ten, in ordinary stables, and very frequently in those of a better class, the interiors are perfectly filthy with dust which lodges on every ledge, and overhung with cobwebs which hang thick and heavy from and between the beams overhead, besides being completely set out with such objects of "vertu" as old sponges, curry-combs, and brushes; bottles of castor oil, dusters, and a dozen other things of the same sort, which are thrown after use upon any projecting beam or ledge that may happen accidentally to be wide enough to hold them.

Now certainly this sort of thing is not agreeable to the eye, and any person who has fine horses, and takes a proper pride in them, should not overlook it; yet the groom, if questioned, will say, and truly too, that he might be brushing all the time and he couldn't keep dust and cobwebs away, so long as there are places for the latter to hang and the former to lodge; in fact, there is only one way, and that is to follow the plan of finishing off that we have suggested, covering up all such places, moreover, making everything so convenient for the most trifling operations of stable economy that there can be no inducement, or excuse even, for carelessness or neglect of any kind.—*Harney's Stables, Outbuildings, and Fences.*

THE CABIN JOHN BRIDGE.

THE Cabin John Bridge which we illustrate on the next page, is one of the principal works on the line of the conduit from the source of supply to the receiving reservoir of the Washington Aqueduct. It spans the Cabin John Creek, which joins the Potomac about seven miles above Washington. It is a stone-arched bridge, of greater span than any other in existence, its clear span being 220ft., or 20ft. greater than that of the Grosvenor Bridge, at Chester. The arch is an arc of a circle of 134·2852 feet radius, and its rise is 57·2624ft. The general appearance of the bridge will be seen from the perspective view on page 414.

The intrados of the arch is, as we have said, struck with a radius of 134·2852ft., whilst the radius of the extrados is 143·2695ft., the depth of the voussoirs being 6ft. 2in. at the springings, and 4ft. 2in. at the crown. Outside the voussoirs is another series of arch stones, which make up the total thickness of the arch at the springings to 20ft., this thickness diminishing towards the crown, as shown in the figures. The width of the bridge on the face of the arch is 20ft. 4in. The abutments are formed by the solid rock, the face of the rock being stepped down, and the steps filled in with concrete on which the footings of the arch bed. The channel through which the water is conveyed consists of a conduit of circular section, 9ft. in diameter inside, and 9in. thick, this conduit being embedded in the masonry of the bridge, as shown in the sections. The haunches and abutments of the bridge are lightened by relieving arches, these arches of which there are five on the western and four on the eastern side, as shown in our engraving, extending through half the thickness of the bridge.

The centering on which the arch was constructed was supported from temporary piers, the vertical timbers bearing upon these piers, and the bracing connecting them carrying a series of struts radiating to the lines of timbers beneath the lagging boards. The keystone was inserted in mid-winter, and the centres were not struck until some ten or twelve months later; and it may be remarked that at times the rise of temperature lifted the arch off the centering. When the centering was struck, careful observations were made to discover if any settlement took place; but none was noticed.

The Cabin John Bridge is altogether a bold work, and it was designed by Quartermaster-General Montgomery C. Meigs, who is, as we have stated, the engineer-in-chief to the Washington Aqueduct, and to whom we are indebted for the drawings from which our illustration has been prepared. The assistant-engineer on that division of the aqueduct to which the bridge belongs was Mr. Alfred Rives.

S. MARY ABBOTTS CHURCH, KENSINGTON.

WE give this week a view of the interior of the new parish church of S. Mary Abbotts, Kensington, now being erected from the designs of Mr. George Gilbert Scott, R.A. Little is known of the ancient parish church of Kensington (or Chenesiton, as it is written in Domesday Book). Originally dedicated to S. Mary, it received its additional epithet of Abbotts about the year 1111, when it was annexed to the abbey of Abingdon. The building lately pulled down was erected in the year 1696, but apparently so unskilfully, that, in 1704, the wall having seriously cracked, and the timbers shown indications of evident weakness, a considerable portion had to be rebuilt. Another renovation became necessary in 1772, when the ancient Gothic tower, which had till then remained, was removed, and its place supplied by the unsightly brick erection familiar to the present parishioners. In 1811 £5000 more had to be spent on the building, and since that period it has, of course, undergone various "repairs and beautifyings." The parishioners recently determined to rebuild the church, and designs were accordingly prepared by Mr. George Gilbert Scott, R.A. The total cost of the new building, which will occupy the site of the old church, will be £35,000. The present contract, which has been taken by Messrs. Dove, Brothers, for £8375, includes only the chancel, nave, and chancel aisles, but the building committee hope shortly to be able to undertake the remainder of the work.

The church, when completed, will accommodate 1600 persons. The style is Geometrical. The width of the nave is 30 feet; and the height, from floor to ceiling, 62 feet. The total length of nave is 107 feet, and of the chancel, 45 feet. On the north side of chancel will stand a lofty tower and spire.

BUILDING NEWS SKETCH BOOK.—No. XXX.

THE ABBAYE AUX HOMMES, CAEN.

WITH the exception of some few remains of the domestic buildings now included in the Lycée Napoléon, the church now called S. Etienne is all that remains of the magnificent monastery founded by William the Conqueror in gratitude for his victory at Hastings, and consecrated some ten years later, in 1077. The spires are, I believe, about a century later, and are the earliest of that large class of spires chiefly found in the neighbourhood of Caen, and which form one of the most distinctive and beautiful features of the architecture of Normandy—and of which the best known is that of S. Peter's Church in the same town, raised in 1308.

These springings, which are of the same date with the apsidal chapels and choir triforium, harmonise remarkably well with the Romanesque towers on which they stand. These towers are oblong on plan, and the spires therefore set in at first more suddenly on the east and west sides, while the north and south have a centre rib running up the entire height. The pinnacles at the angles of the south tower are triangular, those of the north hexagonal. The sketches were taken from the transept roofs.

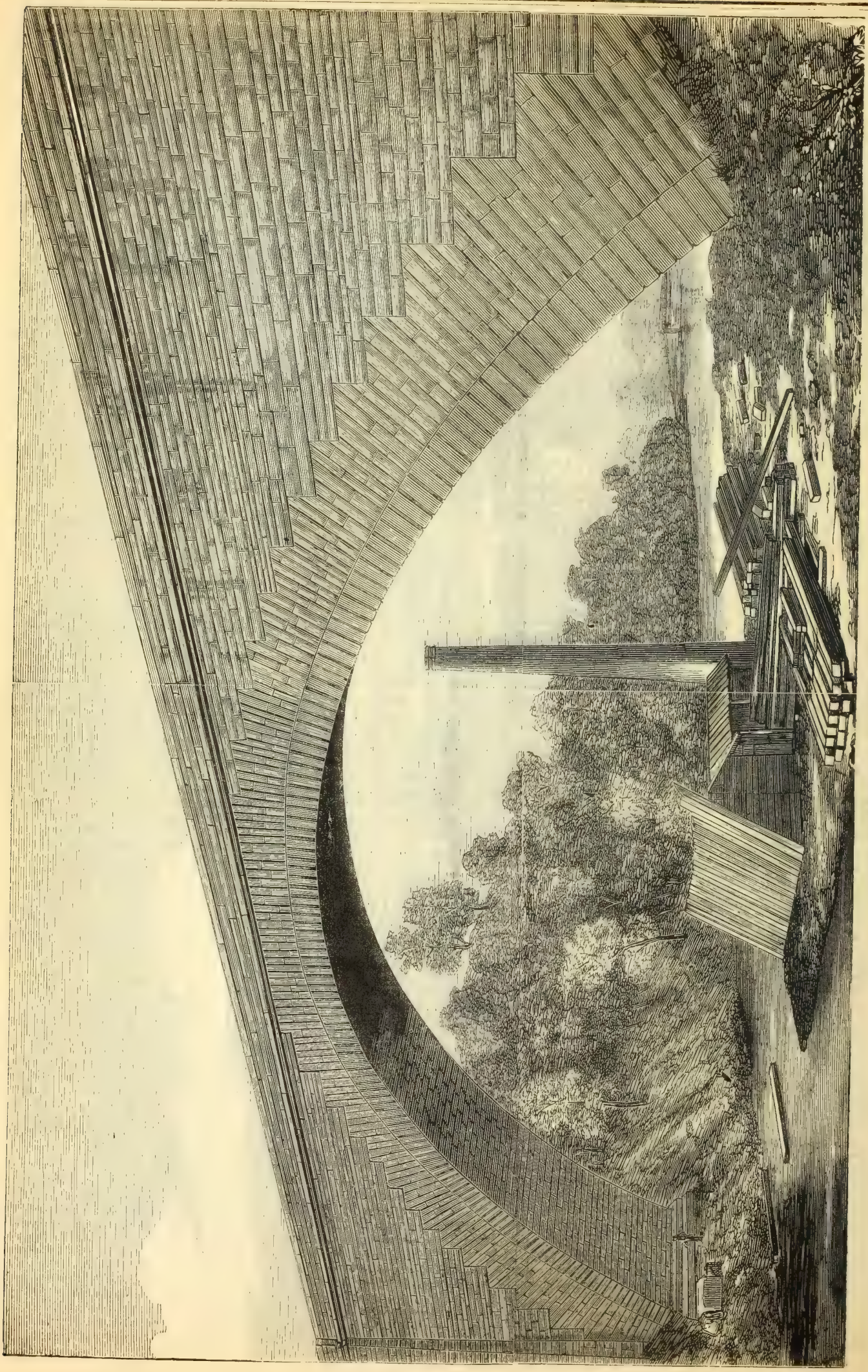
In THE BUILDING NEWS, No. 800, May 6, we gave an illustration of the springings of the north-west spire, and to-day we give the springing of the south-west spire. F. C. D.

MODE OF NOURISHING THE STREET TREES IN PARIS.

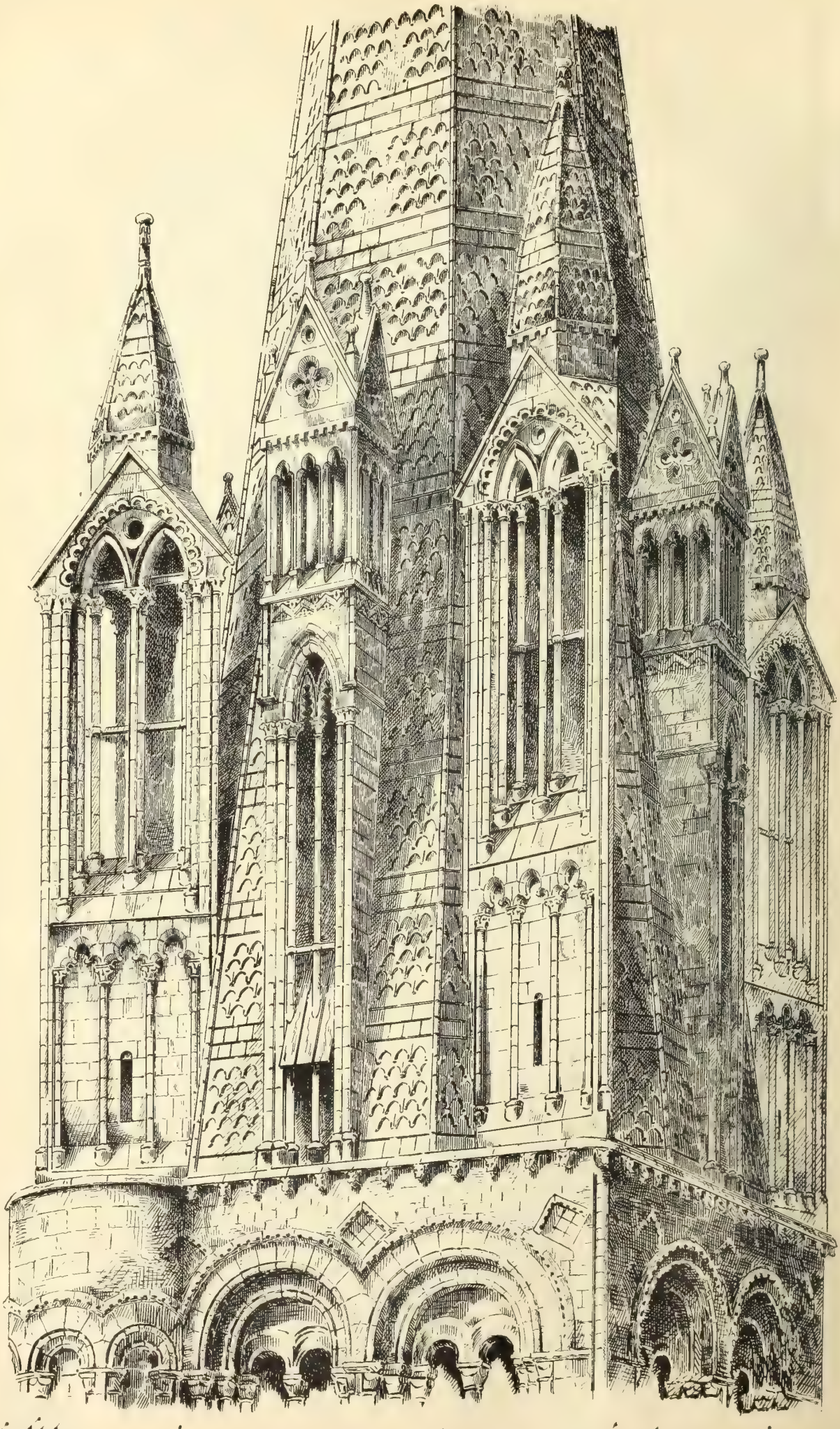
ALL the boulevards of Paris are planted with trees, many of which were, however, destroyed during the revolution of 1848. New trees were therefore planted, and their growth fostered with an amount of skilful attention that has produced astonishing results, when the natural disadvantages are taken into consideration. The trees are planted in loam that has been previously mixed with sand, and transported to the city. This is contained in large receptacles, lined with brick, sunk below the surface of the footway, and coated over with cement, so as to render them impervious. They form, in fact, gigantic flower-pots; and into them are conducted the roof-drains of each house-block, from which the earth derives its water supply. These basins or flower-pots are built of capacity sufficient to admit of considerable expansion on the part of the roots of the trees. An ornamental circular iron grating, set flush with the footway, is placed over these basins and around the trunks of the trees. This admits of air for the proper support of the roots. The roots of the trees are thus removed from the deleterious influences of escaping street gas and the poisonous emanations from sewers—causes which are well known to have destroyed the vegetation in the streets of many cities.

SHEFFIELD SCHOOL OF ART.—Sheffield has the opportunity (says a local paper) of obtaining a copy of the art section of the work prepared by the Indian Government to illustrate the textile products of India. The collection would cost about £100, and would prove exceedingly useful. It would elevate the taste of the local artisans, and prove in many ways educational or suggestive. Pending the establishment of a museum in Sheffield, the plates and volumes could be deposited with the Literary and Philosophical Society, whose rooms are under the same roof with the School of Art.

THE HOUSES OF PARLIAMENT.—The houses in Abingdon-street, Westminster, adjoining the Victoria Tower, are being pulled down. By an Act of Parliament passed in the session of 1867, power was taken by the Government to purchase the entire house property lying between the Houses of Parliament and Lambeth-bridge. At present, only the houses between Victoria Tower and the Palace-chambers, Abingdon-street, will be levelled, and the space occupied by them and their back premises, which extend to the river, made available for enlarging the court-yard next the tower.

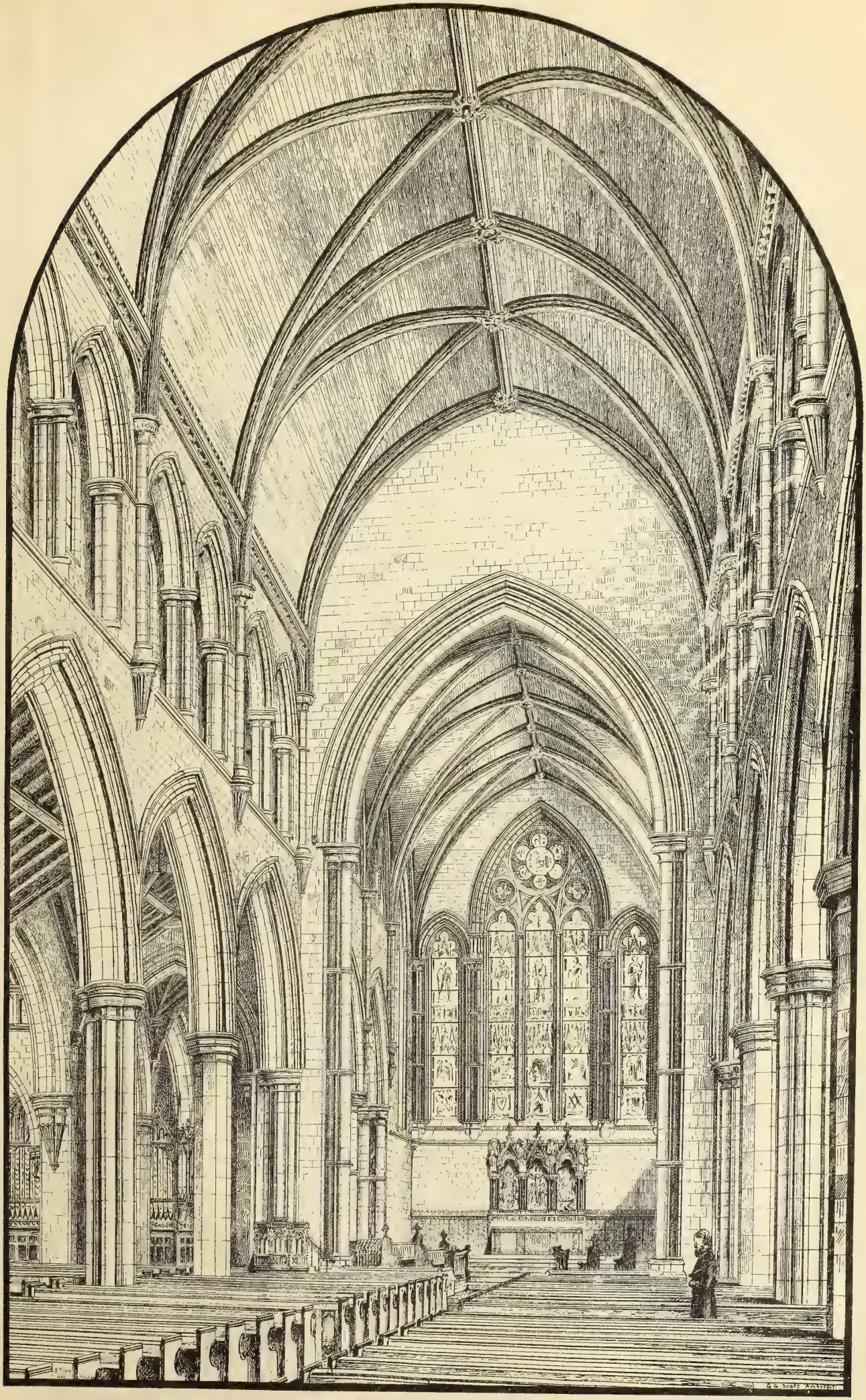


THE CABIN JOHN BRIDGE.—(Described on page 413.)



t. Abbaye ayr bournes Caer ✿ Springing of South West Spire

Photo Lithographed by Whiteman & Bass London



Photographed by Williamson & Bros. London

Church of St. Mary Abbots, Kensington.—G.G.SCOTT, R.A., ARCHT.

BRIEF CHAPTERS ON BRITISH CARPENTRY.

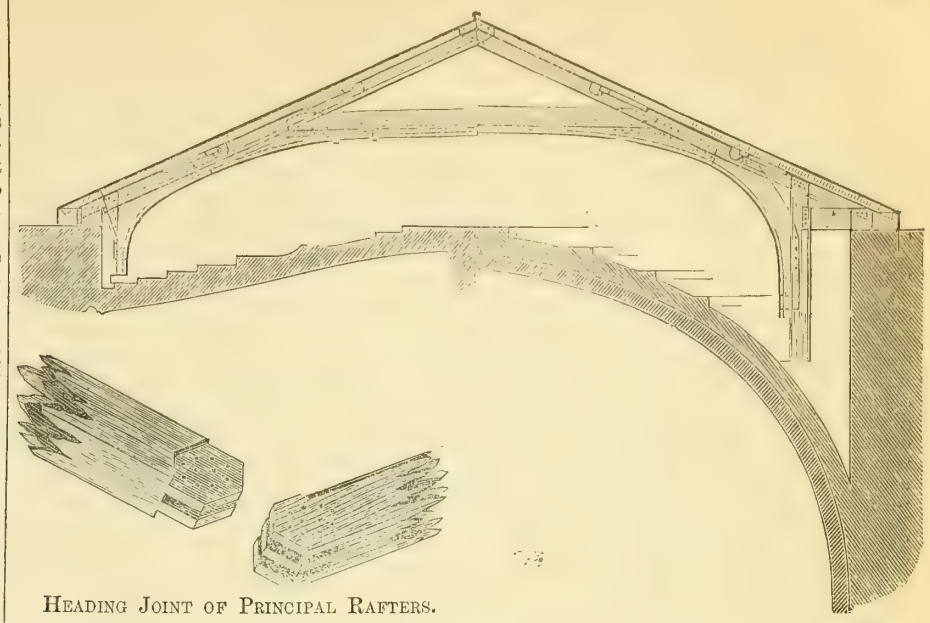
By Thomas Morris.

(*Continued from page* 398).

As a landmark in the history of style and construction King's College, Chapel has especial eminence, and very explicit information concerning it exists. The chapel is part of a royal scheme that, if carried into effect, would have presented the most sumptuous set of buildings of the kind in England. It is remarkable that at a period when the tenure of the throne was precarious, architecture should have been so zealously studied, should have attained to such astonishing perfection, and have received such munificent encouragement. In this, the portion only of a vast but unfulfilled design, we see at once the great mediæval gem of Cambridge, and the most noble and exquisite example of masonry in the kingdom. The scope of the founder's purpose may be seen in its dimensions, but these could hardly be expected from the mere designation of a College Chapel. Externally the length is 316ft., the breadth 84ft., the height of the side walls 90ft., and of the towers 146ft. In regularity it may almost vie with the Parthenon itself; the sides are so similar, and the ends are varied only by the magnificent door at the west. The buttresses have a projection of about 22ft. at the base, but the effect is obviated by a series of chapels in their lower stage, and the thrust of the grand vault for which so large a spread was necessary, is further counteracted by the weight of the walls, which, with that object, are carried far above the vault. The dates connected with this building are exactly kept from the commencement of the foundations by Henry VI., upon the festival of S. James, 1446. Grants were made by the King of quarries at Thelfdale, Heselwode, and Huddlestone, in Yorkshire, together with funds out of his duchy of Lancaster. In the fourteen following years the work is supposed to have made considerable progress, but it was entirely stopped upon the proclamation of Edward IV. (5th March, 1460), who seized the revenues of the College; and though he restored a part for the maintenance of the provost and scholars, allowed nothing from the duchy towards the building. The work stood still for nineteen years, when Dr. Field, warden of Manchester College, was chosen provost of this house, and appointed overseer of the works by the king. The building went languidly on under this monarch and Richard III. Nor was it prosecuted with any considerable vigour till late in the reign of Henry VII., when it was taken up in earnest, and funds for its completion provided, so that in A.D. 1515, the 7th of Hen. VIII., the *case* of the Chapel was finished. The provost and scholars, under the advice of the king's executors or their deputies, were to "vawte the churche of the saide College after the fourme of a platte therefor devised." The stone used (and in these days such information has its use) though partly from Hampole, in Yorkshire, and Clyptham, in Rutland, was chiefly from Weldon, in Northamptonshire.

Timber for the scaffolding and for the outer roof was also given by Henry VII., and partly obtained from Catlige, in Cambridgeshire, and several other places, but principally Wethersfield Park, in Essex, the overseer of the works being Thomas Larke, King's Chaplain, and afterwards Archdeacon of Norwich. The delays were altogether so great that the reign of Henry VIII. was well advanced before this chapel was completed, the contract for the glazing providing that it should be "after y fourme, manner, goodnesse, curyousytie, and clenelyness in every poynt of y^e^ glasse wyndowes of y^e^ kynges new chapel at Westmynster." Through such delays the advantage of a gift of some interest to the campanologist and antiquary was eventually lost. It was intended that a lofty tower should be erected on the western side of the cloister to contain a peal of bells, and Pope Calixtus III. had five cast and sent as a present to the College about 1456; but the temporary wooden frame in which they were hung having fallen into decay, they were laid within the chapel, and proving an inconvenient encumbrance, were sold about the middle of last century.

Roof of King's College Chapel, Cambridge.



Heading Joint of Principal Rafters.

The mechanical and decorative principles of the vaulting are distinct, are equally marked by the highest talent, and together form a triumphant combination of science and art power. Constructively, the vault is reducible to a series of chief and secondary vertical ribs, connected and confirmed by others, horizontal and concentric. The tracery is not produced by general abatement from a single surface, but the ground of each panel consists of a slab laid between the rebated edges of the ribs, just as the panels of joinery are of thinner boards than the styles and rails. It is said in Malden's account, 1769, "This roof is so constructed that it has no dependence on the walls between buttress and buttress on either side, or between tower and tower at either end of the chapel, the whole weight of the roof being so supported by the buttresses and towers that if the above-mentioned walls should be entirely taken away, the buttresses and towers alone remaining, the roof would still continue as firm as it is at this hour." In a purely mathematical view some grounds for this statement may be discovered, but in a practical sense it goes beyond the limit of stability the projectors believed and provided for.

Above the wondrous masonry of these consummate masters was placed the upper and outer roof, a minor emanation, it may be fairly supposed, of the same profound intelligence. Premising that the clear space between walls is 40ft., I shall adopt the description given in Lockwood's edition of "Tredgold":—"The timber roof is built entirely of chestnut, and is framed with a truss over each pier, and one over each window. The truss over the pier rests on a stone projection in the spandrel of the vault, built out from the wall, which would otherwise be weak at this point, being against the passage. Against this projection is placed a post, supporting the principal rafter above, and cut with a projecting curb towards the lower part to receive a curved bracket, the back of which, at the lower end, is tongued into the post, and at the upper end into the principal rafter, and fastened with wooden pins, as are all the joints throughout. Between this bracket and the collar-beam (which is cut in a bent form), is another piece, also curved. This piece is secured to the principal rafter and to the collar beam (which is cut with an abutment to receive it by a key inserted into the three; and this piece, the bracket and the collar beam together, form an arch. An inter-tie, resting on the wall, is fixed to the back of the post, and receives the foot of the principal rafter. Between the trusses and tongued into the inter-ties are double wall plates. The inner one supports the foot of the principal rafter of the truss over the window, and the outer one receives the common rafters. Between the principal rafters and tongued into them, and rabbeted on to the back of the purlins, are boards, cut in the form of arches (wind braces ?). The truss over the window has no inter-tie, and the post stands against the wall, instead of against a projecting pier. In all other respects it is framed in the same manner as the other truss, but the collar beam is rather lower. Under the foot of the common rafters, on each side of the tenon, and stretching partly over the inner wall plate, is a small piece of wood, raising the foot of the rafter about 1½in. above the wall plate, the intention of which could not be ascertained, as its enclosed situation precluded the possibility of examining it. There has recently been a block fixed on to the inner wall plate behind the foot of each common rafter, which is omitted in the engravings. In the section some iron straps are shown, but they are only partial, and should also have been omitted, being no part of the original work, in which no iron or nails were used. The timbers are very heavy, but by means of the posts and brackets the pressure is thrown as low down the wall as the stone roof will allow." From these particulars and the form of the woodwork, it may be concluded that one principle guided the design of the inner and outer coverings. The walls and buttresses, opposed to the stress of the vaulting, were deemed sufficient for the thrust of the roof also. But the situation of the wall posts would seem to indicate a purpose of concentrating the weight of the outer covering in aid of the buttresses, where the pressure of the masonry was greatest. Besides affording protection from the weather and convenience of access for repairs, the raised outer roof may have had less obvious services to perform, and its relation to the vaulting should always be borne mind. The care with which its members were wrought make it probable that it was not always intended to be unseen.

An example of the heading joint of the great rafters, which are about 16in. square, is given in the margin, and there being no ridge, the common rafters were framed and pinned at the top. They are 8in. by 6in., and have a bearing from purlin to purlin of about 8ft.

A good view between the roofs was engraved for the "Cambridge Almanack," 1833.

THE STRENGTH OF IRON AND STEEL.

AT the last meeting of the Institution of Civil Engineers a paper was read "On the Strength of Iron and Steel, and on the Design of parts of Structures which consist of those materials," by Mr. George Berkley.

The author stated that the strength of wrought iron varied with the quantities of work involved in the production of the form of the material tested. This was proved by the fact that a bar of iron 1in. square, which would break with a strain of 26 tons, would, if drawn to the form of wire — $\frac{1}{32}$ of an inch in diameter, bear a strain of 40 tons per square inch. The strength to be relied on in practice would probably be best represented by the minimum strain that 1 square inch would bear without rupture, and by the amount of stretch which would take place in a given length before it broke. Iron could be obtained at the current market rates which would bear the following strains:—For plates, an average breaking strain of 20 tons per square inch, and a minimum breaking strain of 19 tons per square inch, and an average stretch of 1in. in 12in. lineal. For L and T irons an average breaking strain of 22 tons per square inch, and a minimum breaking strain of 21 tons per square inch, and an average stretch of 1¼in. in 12in. lineal. For rivet iron an average breaking strain of 16 tons per circular inch. For bars intended for chains, couplings, &c., an average breaking strain of 22 tons per square inch, and an average stretch of 1⅜in. in 12in. lineal. For ordinary classes of work, let at competitive prices, stronger iron could only be obtained with difficulty.

In the consideration of the practical limit of strain to which 1 square inch of wrought iron could with safety be subjected, and the principle on which such a limitation rested, the erroneous impression as to the degree of strain being 10 tons or 12 tons per square inch which first produced "permanent set" was pointed out, as well as the apparent discrepancy between the results of ordinary observation and of minutely manipulated experiments, such as those of Sir Wm. Fairbairn and Mr. E. Clark, was noticed, wherein permanent set had been observed after 3 tons per square inch had been imposed on the iron, and was explained by the difficulty of registering such small amounts of set as $\frac{1}{1250}$th part of an inch in 5ft., which resulted from a strain of 10 tons per square inch.

Attention was drawn to the fact that upon the application to 1 square inch of wrought iron of strains exceeding about 12 tons, the measure of stretch per unit of strain, which had previously increased in a certain proportion to the units of strain applied, increased with a greater and progressive rapidity. It was also noted that the amount of stretch actually produced by the imposition of a strain of about 12 tons per square inch, would be sufficient frequently to preclude the use of wrought iron so strained.

In illustration of the effect of the repetition of strains on iron and steel, it was stated that with blows powerful enough to bend bars of cast iron through one-half of their ultimate deflection (that was to say, the deflection which corresponded to their fracture by dead pressure) no bar was able to stand 4000 of such blows in succession. And also, that when the bar was thrown into a violent tremor, then "when the depressions were equal to one-half of the ultimate deflection, the bars were broken by less than 900 depressions." A piece of rail, weighing 68lb. per yard, made of Bessemer metal, which, when placed on firm bearings 3ft. apart, bore one blow from a weight of 1 ton falling through 30ft. without breaking, though bending about 7in., broke with a weight of 3¾ cwt., falling 15,400 times through heights increasing from 1ft. to 10ft. by increments of 6in. each time. With wrought iron, it appeared from an experiment of Sir Wm. Fairbairn that when it was desired to repeat the application of strains from 2 to 3 million times it would not be prudent that such strains should exceed 7 tons per square inch of section.

It appeared from these considerations that the practical strength of wrought iron in structures of a permanent character could not be estimated at more than 12 tons per square inch when such an amount of strain was repeated more than a small number of times; and that it should not be calculated as exceeding 7 tons per square inch when strains of this amount would be applied to it many times daily. In some of the principal suspension road bridges, it was said that a maximum of about 9 tons per square inch of section in tension was imposed on extraordinary occasions, while railway bridges were frequently subjected to the maximum calculated strain, a limit of 5 tons being in this country generally adopted. From this practice it was assumed that a margin, for errors of design and for other practical defects, of only 25 per cent. was allowed in permanent structures. The importance of sound principles of design was therefore manifest. The parts most difficult to design were the connections of portions of the structure with riveted joints. It was desirable that the area of the section of the rivets to be sheared, as well as of the plates forming these connections, should be somewhat in excess of the sectional area of the plates or bars which they connected; and that as the process of punching the rivet-holes in the plates, &c., had a tendency to weaken them in a greater proportion than that in which the area was decreased, it was advantageous to drill all rivet-holes in parts exposed to tension. It was represented that the general principles of design were well illustrated by a joint made of a single pin, such as that used in suspension bridges, Warren girders, &c. Examples of various forms of links were presented for consideration, and a form of link of equal thickness, but with an enlarged head, was said to have been proved by experiment to be of about equal strength in all its parts. The proportions of these links were as follows:

The bar	A being 100
The diameter of pin . .	B = 74
The depth of head beyond pin	C = 100
The two sides of the pin-hole .	D D = 125
And the radius of the curve of neck	R = 150

Links of these proportions, with larger pins and narrower sides—Nos. 7 and 7a—and larger pins and sides of the same width, Nos. 8 and 8a., made of iron of exactly the same strength, and links of proportions precisely similar to those adopted for the Menai, Nos. 9 and 9a, the Pesth, Nos. 10 and 10a, the Chelsea, Nos. 11 and 11a, and the Hungerford, Nos. 12 and 12a, were compared. Taking the strength of the standard form, 22,125 tons per square inch of bar area, as = 100, the per centage of gain or loss in power of resistance to ultimate strain by the use of the other forms of links as follows:

6 and 6A = 100			
7 „ 7A = 79·9 ;	loss = 21·1	per cent.	
8 „ 8A = 104·7 ;	gain = 4·7	„	
9 „ 9A = 92·0 ;	loss = 8·	„	
10 „ 10A = 79·8 ;	„ = 21·2	„	
11 „ 11A = 89·2 ;	„ = 10·8	„	
12 „ 12A = 85·4 ;	„ = 14·6	„	

The necessity for strengthening the heads of links, and for testing all of them with a strain equal to at least 10 tons per square inch of bar, was proved, it was believed, by the experiments quoted, and by the evidence of Mr. Provis in his work on the Menai Bridge. It was urged that an examination of the diagrams would show that some links failed with a less degree of stress, on account of the junction of the mass of the head with a comparatively smaller section of bar, by means of a curve of too short radius. This imperfect principle of construction also operated in causing fracture across the centre of the heads on both sides of the pin-hole; and in such designs, the question of the direction of the strain being truly along the axis of the link or bar, and of the strength of the material on both sides of the head being equal, should be considered.

The author next directed attention to the unsatisfactory state of the knowledge of the profession respecting the power of struts of various proportions and forms to resist compression, and stated his belief that the formulæ which had been proposed to facilitate calculations for determining the strain which such columns would bear produced results which neither agreed one with the other, nor with any series of such experiments as had been tried. It seemed probable that for the present error might be best avoided by referring to the results of experiments made upon columns, &c.; the conditions of which were analogous to the case under consideration.

With respect to cast iron, it was stated that a mixture of irons for sleepers had produced bars, 2in. by 1in. in section, which, when placed on bearings 3ft. apart, had on the average of 1151 experiments during the last three years borne 33·4 cwt. placed on the centre, and castings, 1½in. in length and exactly 1in. square, which on the average of 1002 experiments had borne 13·07 tons of tensile strain. An attention to the amount of deflection of the test-bars had been beneficial, the average strain required to break the sleepers having been raised since the amount of deflection of the bars with a given weight had been increased. For the purpose of ascertaining the comparative strength of precisely similar girders cast with iron of varying degrees of strength, as represented by the ordinary test-bars, and when subjected to a direct tensile strain, the experiments detailed in the Appendix (Table No. 7), were tried, the girders being cast of the exact form and dimensions of three of those described in Sir Wm. Fairbairn's "Researches on the Application of Iron to Buildings." The results were as follows:—

The strength per square inch of section was represented in Girder No. 1 by

Mr. Fairbairn's experiments...	as = 32141b.
The first series of special experiments	as = 4977 „
The second series of special experiments	as = 4977 „
In Girder No 2 by	
Mr. Fairbairn's experiments...	as = 33461b.
The first series of special experiments	as = 5264 „
The second series of special experiments	as = 5308 „
In Girder No. 3 by	
Mr. Fairbairn's experiments...	as = 40751b.
The first series of special experiments	as = 4988 „
The second series of special experiments	as = 6300 „

The strength of the test-bars and the tensile strength of the iron used by Sir Wm. Fairbairn were not stated; but it might be assumed to be equal to about 25 cwt. placed on the centre of the bars, between bearings 3ft. apart, and to a tensile strength of about 7 or 8 tons per square inch. The strength of the iron employed in the special experiments was represented by a weight supported by the test-bars varying from 30 cwt. to 38 cwt., and by a tensile strength varying from 10·25 tons to 13·94 tons.

In order to secure these results, the following conditions were represented as important, and should be considered in the design and execution of cast iron work: 1st. The strong iron referred to was obtained by the mixture in the furnace of four or five brands, some being harder than others. In order to amalgamate, as far as possible, these different qualities of iron, the furnace should be charged with them mixed in proper proportions in every basketful of metal which was emptied into it. 2. There would be a difference of about 16 per cent. between the weight that a 2-in. by 1-in. test-bar would support when cast on edge and proved as cast, and that which it would support when proved with the under-side as cast placed at the top as proved; and a difference of about 8 per cent. between the weight the same test-bar would support if cast on its side or end, and proved on edge. This difference it would be necessary to take into consideration in estimating the strength of a large casting made from the same metal as that used in the test-bars. Another, and probably the most important practical consideration, in respect of the strength of castings, was the proportions of their several parts being such as would free them as much as possible from unequal contraction in cooling. It was not often practicable to effect that which would avoid this, viz, to adopt an equal thickness of metal in all parts of the casting; and it was therefore important that some means should be taken to prevent the castings from cooling too quickly.

The Author drew attention to the experiments which had lately been tried with steel,—more especially Bessemer steel—which experiments he considered justified the adoption of the following conclusions: 1st. That Bessemer steel would bear before rupture a minimum tensile strain of 33 tons per square inch of section and stretch about 1in. in 12in. of its length. 2nd. That the same material would bear either in tension or in compression a minimum stress of 17 tons before the extensions or reductions of length per unit of strain became irregular or excessive, as compared with those which had preceded them,—in other words, before the yielding point of the material was reached. 3rd. That this material would probably contain about ·45 per cent. of

carbon chemically combined with the iron. And 4th. That this description of steel, if properly made and annealed, was as uniform in quality as wrought iron—and therefore might be employed (precautions being taken to test its quality as a substitute for wrought iron) while allowing an increase of strain of 50 per cent. to be imposed upon it.

A BUILDING FOR THE LEARNED SOCIETIES.

SOME months since we called attention to a palpable London want—a building for the learned societies—and we are glad to see the subject is now attracting attention. A short time since the Statistical Society did good service to the cause of science in convening representatives of the learned societies to consider whether it would not be possible to obtain a building for their accommodation worthy of the high position they occupy in this great metropolis. At this moment several societies are under notice to quit, others scarcely know where to look for shelter, and many more are utterly unable to find sufficient room for their libraries, instruments, and museums, though they pay a large portion of their income in rent and taxes. It is calculated that, jointly, upwards of £2000 a year is now paid in rent—enough, one would think, if properly managed, to supply most ample accommodation for very many societies, to say nothing of the great economy in service that would result from a joint occupation of a proper building. But so long as nothing is done to bring about some understanding and co-operation among the different societies, the evil is irremediable. Nor is it purely a question of finance. Many abstain from joining a learned society when its place of meeting is either inconveniently situated, or altogether too small for the usual attendance at the ordinary meetings. Not a few members of more than one society are unnecessarily driven from one place to another. The libraries for reference are not half utilised. Co-operation among men of science is almost impossible, and the action of each society is rendered thereby comparatively feeble and ineffective. On every ground, whether of convenience, economy, or utility, the learned societies would do well if they could combine in erecting a building sufficiently capacious for their joint accommodation.

Some learned societies, says a contemporary, have no reason to complain. The Royal Society, the Linnean, the Royal Astronomical, the Geological, the Chemical, the Society of Antiquaries, and a few others, are well accommodated, and a solid structure is being raised for them in Piccadilly. Those whose wants are yet to be supplied are the Statistical Society, the Institute of Actuaries, the Mathematical, Meteorological, Ethnological, Anthropological, Geographical, Archæological, and Juridical Societies, the Social Science Association, and as many more; and it is for them to consider whether it is better to go on as they are doing, paying one, two, or four hundred pounds a year each for their present rooms, or whether they would not do better by combining together for the erection of a proper building for them all. In calculating how many societies could unite for such a purpose, we must take into account the kindred character of their labour and inquiries. The statisticians, actuaries, and mathematicians might well meet together, and so it would be fitting that the antiquaries and archæologists should have a common habitation. But not so those that have nothing in common. Then the number of members and the space required for meetings, libraries, and museums, are important elements. The Geographical Society, with its map-rooms and extensive library, would require space enough for a dozen other societies. And further, the frequency of meetings must be considered when at the most only three or four commodious halls could be secured in any one building. We scarcely imagine, in fact, that any large number of societies could well be united in one building, and that will be a source of difficulty, especially in a financial aspect.

We are not in the habit of asking the Government to do what people can do better for themselves; but this is a question in which the Government may legitimately assist—say in the way of a grant. Much of the greatness and prosperity of the nation depend on the progress made in science, as also on the advancement made in education. And if it be the duty of the Government to promote education for the good of the community, we see no reason why a helping hand should be held out to science, and particularly in the way now suggested. It may be said that science can take care of itself, but that ignorant children cannot. A similar argument may be urged against Government voting money for public parks and museums. No one, however, can deny that the appropriation of public money for parks and museums is a public good, which would not be realized in any other way. The same, to some extent at all events, may be urged in favour of science.

NORTHERN ARCHITECTURAL ASSOCIATION.

THE quarterly meeting of the members of the Northern Architectural Association was held on Saturday afternoon last, in the old castle, Newcastle-upon-Tyne, the president (Mr. Thomas Oliver), in the chair.

Mr. Oliver and Mr. R. J. Johnson were appointed delegates to the Architectural Alliance Annual Meeting. The following were elected Associates:—Mr. Frank Caws, Sunderland; Mr. Thomas Reay, Newcastle; Mr. Thomas Southron, North Shields; Mr. William Bell, Darlington; Mr. Edward Scarth, Darlington; and Mr. Neil McAra, Darlington. The election of additional members of the committee took place as follows:—Two members—Mr. F. R. Wilson, Alnwick, and Mr. Archibald Dunn, Newcastle. Two Associates—Mr. W. H. Dunn and Mr. Connell. A letter from the Royal Institute of British Architects was read, referring to the copyright of designs. The secretaries of the Institute wrote stating that the Council wished to know whether clients have a right to the drawings prepared by architects, and whether it is the custom of the members of the Association to give them up, and, if so, whether they do so as a custom and right, or only occasionally as a matter of courtesy. The question arose out of the demand of the Government to Mr. Barry to give up the drawings of the Houses of Parliament, and the Council were desirous of obtaining information which might guide the profession in regard to the question involved in this demand.—The President stated that on the 16th April, 1861, the Association adopted a scale of professional charges, and a note was printed with the charges to the effect that the copyright of designs and drawing were in all cases the property of the architect, but the code of charges prepared since that date by the Royal Institute had been adopted. He had been in practice for twenty-two years, and to his knowledge he did not know that he ever gave up a whole set of drawings to any person. He had frequently given a copy (but not the original) of a drainage plan, or any plan which gave any necessary information as to the arrangement of a building. Unquestionably the custom in the north of England was never to give plans up. If the plans demanded by the Government were given up they would do no good to the public, as they would probably be put in a damp room, and soon be destroyed, but so long as they were in the possession of the architect, he could improve himself by referring to them. As to wanting the plans in order to understand the flues and drains of the House of Parliament, he thought they would be useless, as the flues and drains laid down in original plans were very often altered in the course of building.—Mr. R. J. Johnson moved the following resolution:—"That the universal custom in the north of England has been for contract plans and drawings, and all plans necessary for affording a complete knowledge of a building, to belong to the architect; and the plans to be retained by him on the completion of the work."—Mr. C. H. Fowler, Durham, seconded the resolution, and it was agreed to.—It was resolved to send along with the resolution a copy of the note read by the President, and which was adopted by the Association in 1861.—A paper on "Sketching Classes" was read by Mr. C. H. Fowler; and after pointing out the great advantages to be derived from sketching which trained both the eye and mind, he recommended that the best means to promote sketching, was to form a class in connection with the Association, to be open to all articled pupils and members of the Association, and a meeting to be held every alternate Saturday for sketching. All the sketches to be sent in to the committee, and prizes to be awarded at the close of the year. He also recommended that arrangements should be made with the School of Arts in the town with regard to the formation of a class for indoor sketching.—On the motion of Mr. W. M. Dunn, it was agreed that the suggestions of Mr. Fowler be considered by the committee. The meeting soon afterwards terminated.

MODERN ARCHITECTURE IN WESTERN INDIA.

SIR BARTLE E. FRERE, K.C.B., G.C.S.I., delivered a lecture on this subject at the Royal Architectural Museum, Tufton-street, Westminster, on Wednesday evening, the 25th ult., Sir Walter James, Bart., in the chair. After entering at some length into explanatory remarks concerning the ancient architecture of India, Buddhistic, Brahminical, and Mahometan, the lecturer proceeded to treat of the modern architecture of the empire. He said that when the English nation suddenly found itself the possessor of the great empire and of its great works of architecture, architecture in England was at such a low ebb that we could not realise what was essential to the progress of the art in India. It was difficult to describe the general character of our early Anglo-Indian architecture; its only characteristic was extreme broadness—an utter absence of anything like distinctive features. This was only to be accounted for by the fact that we sent forth our representatives to receive and acquire the Indian empire at about the same time as we were building Red Lion-square and the acres and miles of featureless streets, roads, and squares, and the nightmare churches so unlike anything which is dreamt of as a church, whether in a town or a country village. Our ancestors, in consequence, left no good architecture behind them in India. An ordinary Indian station was as nearly as possible like a nightmare of umbrellas in brick and mortar. Were the materials bricks and mortar, stone, or anything else, they were put together so as to afford shade and shelter, and nothing else. In Kurrachee, for example, it is impossible to conceive of anything uglier than the buildings of the place as carried out by the British officials (of whom Sir Bartle was one). In Kurrachee there are nothing but straight roofs, projecting on each side, and giving plenty of shade and shelter, mounted upon a certain amount of bricks and mortar, or timber—but of anything like architecture there was, up to the time he left the place, none, although there was a population as large as that of Bath. Perhaps it might be said "But we have heard of a certain 'city of palaces'—Calcutta; surely there are some palaces there?" Well, although he was travelling out of Western India, he could only say that the "palaces" of Calcutta were palaces of brick and stucco, built on a foundation very much resembling that of our own good town of Sheerness; a hundred years hence, probably, the English people would not look with very great pride on the "City of Palaces," because the materials employed are not such as any architect would use for architecture of a high order or intended for posterity. In Bombay things were little if at all better. The Government House there was a Jesuit church, and whatever feature it may possess of architectural grandeur is certainly not due to the British Government. At Madras there are one or two very good buildings connected with the Government, but architecturally they are such as would be found in almost any second-rate country town in England, and their pleasing effect is due to a very beautiful variety of plaster which is afforded by the corals and shells of the coast. The whole of what the English Government has done for the adornment of the capitals of India may be summed up by saying that very few public buildings have been erected which would be considered in any small seaport town in this country to be above ordinary merit. But while this is true of the Government, there is much in all the Presidency and chief towns of India of great architectural interest, due, as is the case in most parts of the world, and under all governments, to the people themselves. It has no more been in our power to impress permanently upon the architecture of India any feature of our own than it has been in the power of any government in Europe to give an architectural bias to what is built by the people over whom that government rules. Of course in a long series of ages much may be done by a government, and, as we see in France, a government may, by power steadily and sternly applied during a whole generation or two, produce an amazing result on one large city; but what is likely to be

the verdict of posterity when they contrast the modern architecture of Paris with the works of the great architects who preceded our own age? There were many who would lament, even for the good results that had been achieved, the destruction of much that was interesting in old Paris; and where were the buildings in modern Paris that could compare with the cathedrals and chateaux of France? and will not these cathedrals and chateaux be speaking architecture to posterity when Paris has ceased to be regarded as more than immense mountains of stone? We were very apt to decry our own City of London as inferior to the capital cities of the despotic powers of Europe, but in London was to be seen the impress of an architecture that grows from within—an architecture that expresses what the people think, and feel, and mean, and not what they are told to think, feel, or mean, as was too often the case in the despotic capitals of Europe. The lecturer then went on to describe the state of Indian civilisation at the time the Empire came under British rule, and referred to the state of Bombay when Mr. R. W. Crawford (now M.P. for the City of London) was Chairman of Justices in that place. Mr. Crawford instigated great reforms. He found the city without good water to drink, without drains to carry away the refuse, and without any of the conveniences of modern civilisation except a few good roads; and he proceeded to supply the city with water, and to construct good drains, in which work he was ably seconded by the whole body of English and native justices, and received great assistance from the Royal Engineers, Mr. George Clarke, an engineer in Bombay, and Mr. Conybeare, an architect, who erected the first church worthy of the name in India. This church, however, owes some of its best features to Mr. G. G. Scott, who was appealed to to give a design for a memorial church to those who fell in the Affghan wars. He gave a very beautiful design, but one too elaborate to be carried out for the money; therefore another design by Mr. Conybeare was substituted. The erection of this church gave an immense impulse to the spread of good architecture in India, and much of this impulse was due to two members of the Museum, Mr. T. Roger Smith and Mr. Trubshaw. The latter gentleman went out to Bombay at a time when there was a great influx of wealth into the city, and when many men who were in trade or business found themselves possessed of very considerable means, and the native merchants used this unexpected wealth in a manner which would have done honour to any community of Englishmen. The lecturer concluded by dwelling at some length on the public-spirited liberality of the Parsee and other native gentlemen, and on the influence which their munificence has had on the architecture of the great cities of the Empire. He referred to the labours of Mr. Parris, Mr. Morrisey, and Mr. Emerson, who had, he said, all followed in the steps of Mr. Trubshaw in endeavouring to found what he believed to be an indigenous school of Anglo-Indian architecture, as extensive and as distinct as the pure Hindu and Mahometan schools of former days; and he believed that if God granted us grace to hold the empire of India for a few generations longer, we should leave behind us in architecture, as in other respects, such marks of our government as posterity would not soon forget.

ROCK DRILLING APPARATUS.

OUR attention has recently been directed to a new drilling apparatus, first patented and extensively used in America, and now introduced into this country. It was invented by Mr. Burleigh, and is now presented to the British public through Messrs. Browne and Company, Newgate-street, London. One of these machines carrying a 2-inch drill, weighing about 5cwt. and standing about 10ft. high, including the tripod, was recently set to work at the stone wharf of Messrs. Freeman, Deptford, in the presence of a select company of gentlemen specially invited for the occasion. The machine was erected just as seen in our engraving, except that it was set work vertically over a large block of the hardest Cornish granite 3ft. in thickness, and was actuated by steam from and adjacent boiler. The steam was conveyed through about 60ft. of pipe, unclothed, and reached the apparatus at a pressure of about 68lb. Upon the present occasion a 2-inch drill made from a bar of hardened steel was used, and which cuts a 2¼-inch hole. At starting the points or edges of the drill, which is cruciform in plan, were broken off. The working, however, was continued with the broken drill, with which a hole 1ft. 8½in. was bored in 3min., a wonderfully short space of time as compared with hand labour. A fresh drill bar was then substituted for the damaged one and the work was resumed, the 3ft block of granite being pierced through in 4min. and 7sec. This was at the rate of about 9in. per minute, the apparatus working at about 300 strokes per minute. The drill was then shifted a few inches, and another hole was drilled through the block in 3min. 15sec., the drill being the same as that used in cutting the previous hole. The machine was then set to drill at an angle of about 60deg. from the vertical, and, still working with the same drill bar, the granite was pierced diagonally to a depth of 22½in., the time occupied being 2¾min. The feed having run out, a longer drill bar had to be used, which finished the hole in 15secs. more, the total depth being 27in. This result is equally satisfactory with the rest, especially when it is considered that the stone not being fixed vibrated very much and thus retarded the operation. At the request of some of the visitors present another vertical hole was drilled, in order to prove how rapidly the machine could be made to penetrate the stone. This boring was effected in 3min. 10sec., and with a drill which had already bored through 8½ft. of granite without having been sharpened. This incredibly short space of time was inclusive of two slight stoppages of the machine, caused by carelessness on the part of the man who fed the jet of water into the bore hole. This jet of water is used to clear away the dust and debris, and owing to the attendant turning the jet off twice unnecessarily, the drill bar stuck in the hole. Had this not occurred the granite must have been holed in 3min., or at the rate of a foot per minute.

The experiment was resumed on the following day upon a block of blue Aberdeen granite, into which a hole 2ft. 2in. deep was bored in 4min. when the drill points broke. Another bore was then started with a fresh drill, which reached 2ft. 2in. in 3min. 10sec., when this drill point again broke. A third drill was then placed in position and a third hole commenced in the same block, and in 2min. 40sec. the drill had reached a depth of 2ft. 2in., when the points of this drill also broke. A fourth hole was soon started in the same granite at an angle, and 2ft. 5in. were bored in 3min. 10sec. Operations were next transferred to the block of Cornish granite, and a depth of 2ft. 4½in. was reached in 3min., when a fracture occurred in the stone. Another hole was commenced in the same block and carried on to a depth of 2ft. 5½in. in 3min. 24sec., when another fracture took place in the stone, which was already well pierced with drill holes. The same drill was used in the last three experiments, and therefore cut through 9ft. 5in. of granite without being sharpened. The results of these experiments will be seen to be highly satisfactory; they testify to the efficiency and importance of the Burleigh rock drill, which has unquestionably proved itself to be the best machine of its kind extant.

OBJECTIONS AGAINST THE STEAM ROAD-ROLLER.

THE only objections we have ever heard raised against the steam-roller, says Mr. F. A. Paget, in his report referred to last week, are the usual objections against the working of any traction engine on a road or street; viz. (1), that its weight is dangerous to the water-mains and gas-pipes; and (2), that its working in the streets is liable to frighten horses.

Too heavy.—Now, in the first place, it is clear that both these objections must bear with much less force on the steam road-roller than on the ordinary traction engine. The weight of the steam road-roller is, by the very nature of the work it has to do, much more equably distributed over the surface of the road than is the case with the traction engine. Further, this evil reputation of destroying mains was gained by the thirty-ton, the thirty-six ton, and not by the fifteen-ton rollers now preferably employed.

Frightening horses.—As regards frightening horses, this could, on the more frequented thoroughfares, be easily met by only working at night; or, as they are now doing at Islington, working during the day, and simply blocking up the thoroughfare—making use of the permission to do this given by Act of Parliament to the vestries. Harnessing an old horse in front of a traction engine has also been found to have a wonderfully quieting effect on the others in its neighbourhood. That this danger, with proper precautions on the part of the fireman, and with a proper construction of engine, is very slight indeed, is proved by the experience of years in Paris. The Prefect of the Police requested, in 1861, the Prefect of the Seine to allow the engine to work only during the night; but experience showed, as he wrote in December, 1864, that they could work "even the whole day, on the most frequented thoroughfares." We, as well as other visitors to Paris, have seen the steam-rollers at work in the open day without any disturbance or danger to the traffic.

Further, that this danger is exaggerated can also be testified by evidence given in 1859 by the late Mr. Macadam, son of the celebrated Sir John Macadam, and then General Surveyor of turnpike-roads, before a Select Committee of the House of Commons. Speaking of a long journey he made with an engine and train, he said:—"We had met several cart horses; they had noticed it a little, but not enough to require us to stop. Once or twice, near London, I went forward for the purpose of holding some carriage horses, but the coachman told me not to do so, as he would be able to manage them; the horses just stared at us and then went on. Generally speaking, when we came to the town we were inconvenienced by the number of people who were riding round us; we had forty or fifty people riding round us in one of the towns. Some of the horses made a great objection at first, but the gentlemen coaxed their horses up to the engine, and the thing ended in every one of them following us. We never had anything to do but to stop the engine, and then if the horse was frightened, his rider would get down and coax him. The frightening of a horse is not, I think, a matter of so much consequence as should prohibit the use of these engines. I think the use of them will obtain some day or other, and I think, some day or other, horses will become accustomed to them. We found that at first railways were a great nuisance to horses—so much so, that in the General Railway Act power was given to the Board of Trade to order screens to be put up for the protection of public roads. During the early stage of railways I was excessively particular about that, and insisted on screens being erected; some of those screens have since worn out; other railways have been made since, and I have endeavoured to get screens put to them, but the very gentlemen who had been in the habit of using the road said that they did not want them; and I think myself, and I know from experience, that horses have become accustomed to railways; and I think that they would become accustomed to these engines in the same way. Now horses that use turnpike-roads now-a-days are wonderfully constant to particular pieces of road; we find on passing through gates, that we have the same horses week by week and day by day. Our through traffic is entirely absorbed by railways; if a horse saw an engine to-day he would see it again to-morrow, and would soon get reconciled to it." As we have already observed, the evidence of Mr. Macadam applies to traction engines only; and with all the more force to road-rolling engines.

On this head we may also quote some observations made last March by Mr. W. Bridges Adams, the celebrated inventor and engineering writer, at the Society of Arts:—"The startling horse is simply a wild beast, and no one has a right to bring a wild beast into the streets or roads; and if a fine is to be levied, it should be on the owner of the wild beast, and not on the well-behaved, orderly engine. Horses that go into the army are not addicted to taking but rather to giving fright, and it should be simply disreputable to be the owner of a wild beast. The horse should be as noble in his qualities as the gentleman who owns him, gentle, and brave, and intelligent. What grooms call a 'fool of a horse' is not worth keeping, and every horse worth keeping is capable of education; and we may be very sure that when our Fifth Harry 'witched the world with noble horsemanship,' it was on an educated charger, 'a fiery Pegasus that could turn and wind,' and not on a wild beast. He must be a man of very limited taste who could wish for the extinction of horses by utilitarian engines, but in truth the engine is the friend of the horse, redeeming him from mere drudgery for the purposes of pleasure. We may take it as an axiom that every horse worth keeping is capable of education."

SOUTH KENSINGTON AND PUBLIC SUSPICION.

THE *Daily News* makes the following remarks on the contemplated alterations of Hyde Park :—

"Londoners are very exacting in all that concerns Hyde-park. They do not object to any real improvements being made in it. On the contrary, no act of the Board of Works has been more popular, or has given more satisfaction, than that which has had the result of filling some vacant spaces with choice evergreens, and others with beautiful flowers. When told that the Royal Park of Melbourne, the Central Park of New York, the Bois de Boulogne of Paris, are all superior in some respects to Hyde-park, the genuine Londoner is disposed to be incredulous, and is apt to disbelieve in the possibility of anything being equal to the Park which he loves. Owing to the prevalence of this feeling, the difficulty of effecting any alteration in Hyde-par is exceedingly great. Every step is noted with suspicion, and every proposition is scrutinized in order to see whether or not it is entirely free from lurking mischief. To the predominance of a fear that the "Kensington-road Improvement Bill" has been insidiously planned to destroy a portion of the Park, is attributable the sudden outburst of opposition which has been manifested against that measure, both within and without the walls of Parliament. Not only is that Bill misnamed, inasmuch as, not the improvement of the Kensington-road, but the benefit of the shareholders in the Albert Hall of Science, forms its purpose ; but in a narrower sense the designation is misleading, for the destruction of Kensington-road would be effected if the Bill became law. Mr. Ayrton, indeed, promises a parliamentary Paper, with plans and explanations of the fullest kind, as to the nature of the proposed encroachment on the public estate ; and it is possible that if a national structure were to be improved at the sacrifice of a portion of Hyde-park, the end might fairly be said to justify the measure. But that a West-end Alhambra should be rendered more accessible to its fashionable frequenters is a design which the nation cannot be justly called upon to advance. Those who make sacrifices of self-respect in order to gratify personages in exalted positions, may attain their immediate object, but they will at the same time render themselves thoroughly unpopular. The public would be far more proud of South Kensington if the very name had not become a synonym for jobbery or intrigue."

PARLIAMENTARY NOTES.

WATER SUPPLY IN THE METROPOLIS.—Mr. Whalley asked the Secretary of State for the Home Department, with reference to the recommendation of the Royal Commissioners, that the supply of water in the metropolis should be on the system of constant instead of intermittent supply, whether it was the intention of the Government to adopt any and what measures with a view to giving effect to such recommendation.—Mr. Bruce said the recommendation of the Royal Commissioners went much further than the mere question of an intermittent or constant supply of water. They proposed that the task of supplying water should be transferred to a central body, and that every householder should be obliged to take water on condition of being supplied constantly. Now, in order to give effect to the recommendations of the Commission, it seemed necessary to create a central authority for the metropolis. He had been in communication with the Metropolitan Board of Works on the subject, and having given to it all the attention in his power, it appeared to him that this measure could not be properly carried into effect unless in connexion with the measures for creating a general government for the metropolis.

THE HOUSES OF PARLIAMENT. — Captain Dawson-Damer, on Monday, asked the First Commissioner of Works if it was true that in consequence of the want of plans of the flues, &c., of the Houses of Parliament the person in charge of the arrangements for the prevention of fire in the building did not hold themselves responsible for its safety; and, if so, whether he did not consider it requisite, in order to prevent the possibility of a recurrence of a disaster, to provide some plans to ensure the preservation of the building.—Mr. Ayrton said it was undoubtedly true that the Office of Works was not in possession of accurate plans of the flues, which was a source of considerable inconvenience, though he could not go the length of saying that the parties who were in charge of the building declined to be responsible for its safety. The hon. member was perhaps aware that steps were being taken to obtain plans ; and he trusted that, in some way or other, the Office of Works would be able to procure information on the subject, so as best to enable those who were in charge of the building to perform their duty.

LEICESTER-SQUARE.—Captain Dawson-Damer asked the First Commissioner of Works if it was true that the continued state of Leicester-square arose from a disputed ownership ; and, if so, whether some steps cannot be taken to ascertain who is liable for the present condition of the square.—Mr. Ayrton said he might remind the house that an act was passed some years ago by which the local authorities in the metropolis were enabled to take possession of any vacant spot for which there did not appear to be any owner, and under that act an attempt was made to take possession of Leicester-square ; but it seemed that an owner appeared and claimed the property, and so satisfactorily asserted his right as to prevent any further action being taken ; and being private, the owner might do as he liked with it, however disagreeable the appearance of the spot might be in the eyes of those who had to pass it. He knew of no mode in which it could be made more agreeable, except by putting in force a law for dispossessing owners, and applying the land to some useful public purpose. There was a general act for the purpose of widening thoroughfares and opening streets, but he was not aware of any act that would enable him to deal with spaces enclosed. He believed it would be necessary to pass a private act in order to compel the owner to sell. That, however, did not come into his department, but was entirely for the local authorities.

THE NEW LAW COURTS.—Mr. Alderman Lawrence asked the First Commissioner of Works when a block-plan of the new courts of law, showing the proposed approaches to the courts, would be placed in the library for inspection.—Mr. Ayrton said that the plans were in course of construction, and were in an advanced state, but they had taken more time to prepare than was anticipated. He was not in a position to place any plans on the table of the house before they had received the requisite sanction, but he should take care that hon. members had an opportunity of seeing them before any vote was asked for.

THE KENSINGTON-ROAD IMPROVEMENT BILL. —In answer to a question from Sir H. Hoare, Mr. Ayrton said that the Bill had been laid on the table, and in order to prevent the possibility of misapprehension, he thought it better, instead of sending it to a select committee as he at first proposed, if he gave some explanation in the shape of a Parliamentary paper ; but as this would take a little time to prepare, he did not propose to go on further with the motion that night.—Mr. S. Aytoun wished to know whether the right hon. gentleman had objected to marking with white the trees he proposed to cut down, and also to mark out with white the portion of the Park he intended to remove.—Mr. Ayrton replied that persons of experience had informed him that it would not be necessary to cut down trees. They might be transplanted. (Oh, and laughter.) At least that opinion was entertained. He certainly should not incur the responsibility of cutting down trees if the qualified officer advised that they could be otherwise removed.—Mr. J. Locke asked when the right hon. gentleman intended to try his experiment of transplanting. —Mr. Stapleton wished to know whether the road from Queen's-gate to Exhibition-road, which had been made through the Park at great expense, was to be done away with.—Mr. Ayrton replied that that road would be left as it was. The object of the Bill was to bring the other road into harmony with that which had been made with so much expense.

THE WELLINGTON MONUMENT AT S. PAUL'S. —Earl Cadogan, on Tuesday, asked the Marquis of Lansdowne when the correspondence, for the production of which he moved some time since, relative to the Wellington monument at St. Paul's would be laid on the table of their lordships' house.—The Marquis of Lansdowne said it was in course of preparation, and would be produced in a short time.

Building Intelligence.

CHURCHES AND CHAPELS.

CHEAP CHURCH BUILDING.—There have been numerous rumours floating about for some time that the pillars in the new church of S. Swithin, Lincoln, now building, are cracked, and utterly unable to carry the weight placed upon them. A few days ago a meeting of the Building Committee was held in the vestry, when the matter was discussed, and it was unanimously determined that the blame attached to the architect, (Mr. Fowler, of Louth,) and he was required to pull down the interior pillars, and rebuild them at his own cost. To this resolution Mr. Fowler demurred. He admitted that the pillars must come down ; but he did not think that he was called upon to rebuild them. On Friday last another meeting of the committee was held, and Mr. Fowler attended. Mr. Fowler admitted the necessity for immediately pulling down the pillars, which have cracked in all directions, but affirmed that the cause of their giving way must have arisen from accident, or from bad workmanship ; whilst several members of the committee insisted that the giving way of the pillars was caused by the wretched material that had been used. After a long discussion, it was ultimately resolved that Mr. Christian should examine the pillars and report the cause of the failing. If the cause arose from improper design, or from the material used being inadequate to bear the superincumbent weight, then the architect is to bear the cost of re-building ; but if the defect arose from bad workmanship, then the cost of re-building should be borne by the contractor,—the costs of the reference to follow the decision. This resolution was agreed to both by Mr. Fowler, the architect, and also by Mr. Lovelee, the builder, and both parties signed the resolution, and bound themselves to abide by the decision of Mr. Christian.

LIVERPOOL.—The foundation stone of a new "Free Gospel Church" was laid at Liverpool on Saturday last. The chapel is estimated to cost about £1800. The plans have been prepared by Mr. J. Thompson, architect, of Lancaster. In its architectural features the building will be extremely plain, and partake to some extent of the Elizabethan style. It will have galleries and open seats, and provide accommodation for nearly 400 worshippers.

PRESTON.—Emmanuel Church, Brook Street, was consecrated by the Right Rev. James Fraser, 23rd ult. It is built of brick, interspersed with D.D., Lord Bishop of Manchester, on Monday the strings and bands of coloured and moulded bricks with stone dressings. The style of architecture is Geometrical Gothic. The plan is cruciform, and the ground floor accommodates 632 adults—150 in the west gallery, and 92 in each transept gallery. There are four entrances to the church, viz., the tower doorway, the double doorways at the west end, and one to each transept, which answers for the galleries. The entrances are so arranged by double doors that everything in the shape of draught is obviated. The west entrance is approached by a porch projecting about 7ft., which is surmounted by an ornamental carved stone cornice, and a neat balcony with trefoil and quatrefoil perforations having large carved leaves at the angles. Over the archway in front of each door is a handsome gablet with panels underneath, left for carving some appropriate subject. The vestry is on the north side of the chancel, and has an outside door intended to be an easy approach for the minister from the parsonage when erected. Adjoining the vestry on the north is the entrance to the transept, and staircase to its gallery. The organ chamber is on the south side of the chancel, and has arches as large as practicable opening into the nave and chancel. On the south side of this chamber is the entrance to the south transept, and the staircase to its gallery. The tower at the south-west corner, which is a prominent feature in the design, is 12ft. square inside, and has in it the staircase for the west gallery. The whole is crowned with stone cornice. At the four corners are octagonal pinnacles of brick, terminating in massive stone weatherings and fleur de lis. The nave is lighted by two and three light windows on the north and south sides, filled with plate tracery. The transepts are lighted on the west by two single lights, and at the ends with three single lights. The chancel window is a five light, with two quatrefoils and a large circle above containing three

trefoils. The west window is a four light, with tracery above. The roofs throughout are open timbered, of pitch pine, and the chief ones are boarded on the spars diagonally. The extreme length over all from east to west is 125ft.; breadth over transepts, 86ft.; breadth of nave, 40ft; chancel, 20ft.; transepts, 25ft. 6in.; length of nave, including vestibule, 86ft. 6in.; chancel, 27ft.; organ chamber, 13ft. by 11ft.; height of nave from floor to ridge of roof, 45ft.; height of tower from ground to top of pinnacles, 100ft. The pulpit is placed on the north side of the church, and is approached by an arcaded staircase between the chancel and vestry. It is of Caen stone, resting upon five columns, the centre one being the largest of Leeds stone, the others of Longridge. The caps are in Caen stone, and beautifully carved by H. S. Miles, each shaft standing upon well-moulded Longridge stone bases. The pulpit is octagonal in plan, having five complete sides. The font is placed in a baptistry at the west end of the church, and on the north side of the vestibule. It is of Caen stone, octagonal in form, and stands upon an octagonal shaft, with small Leeds columns at each angle. A well executed band of conventional carving surrounds the whole at the top of the caps. The prayer desk is of Dantzic oak, and is of elaborate design. The land for church and schools, pulpit, font, and prayer desk, have been presented by Thos. Tomlinson, Esq., of London. The architects of the edifice, its furniture and fittings, are Messrs. Myres, Veevers, and Myres, of Preston; Mr. John Pownall was clerk of works, and Mr. John Bamber the builder.

SMALL HEATH.—The memorial stones of a new chapel and schools, which are in course of erection in Small Heath, Birmingham, were laid on Monday afternoon. The building will accommodate about 400 worshippers, and the total cost of the building will be between £800 and £900. Mr. G. Ingall is the architect: and Mr. Lidzey the builder.

SOUTHBOROUGH.—The foundation stone of a new church was laid on Tuesday week at Southborough, Kent. There will be a chancel and two transepts, and the church will be in the early Gothic style, built of local stone, with Bath stone dressings. It will be lined internally with red bricks, and will have an open timbered roof, covered with tiles. The church is to hold about 300 people, and is to be completed in seven months from the time of commencement, at a cost of about £1800, by Messrs. Willicombe and Oakley, the architect being Mr. Theodore H. Green.

BUILDINGS.

CARSHALTON.—On Monday week the memorial stone of the first villa erected by E. H. Rabbits, Esq., on his Strawberry Farm Estate, Carshalton, was laid by Mr. Jonah Cressingham. Strawberry Farm lies to the north of the new line of railway, the railway embankment bounding the estate on one side, the other sides of the estate presenting frontages to three good roads, one of which skirts Hackbridge Park. The whole is well timbered. It is arranged to have but one road through the estate, which, with drains, are being formed and made. First-class houses are to be erected, with from half to an acre of ground to each. The estate is being laid out and built upon from plans by Mr. J. D. Hayton, of 5, Whitehall, S.W.

HOLT TOWN.—The foundation stone of a new building intended for the purposes of ragged schools was laid in Holt Town, Manchester, on Saturday last. The new edifice will be a plain brick one of two stories, and capable of accommodating 500 children. It will be 35ft. long by 28ft. 6in. in width. On the ground floor will be the infant school and two vestries, and on the upper floor will be the general school and two class-rooms. The builder is Mr. Benjamin Hoyland, of Bradford, near Manchester, and the cost is estimated at £900.

LUGGAN.—The foundation stone of a new Carmelite college was laid on Saturday, 11th ult., at Luggan, Ireland. The general plan of the college forms three sides of an elongated-quadrilateral figure, with a centre block between the wings. The general height is three stories. The work commenced embraces the whole of the principal rooms, inclusive of the inner hall, 100ft. by 50. A grand staircase of elaborate design will be fixed in the centre of this hall, and surrounding this staircase at its first landing will be a gallery for sculpture. At a height of 90ft. from the hall floor, springing from the stone groined ceiling, will be a lantern light, having four tracery sides to be filled in with stained glass. The building will be constructed of local stone, quarried on the spot, with a free use of free-stone, and various coloured marbles. The style of architecture adopted is early English, or semi-Norman. It is estimated that there will be upwards of £7000 worth of carving in the present contract, inclusive of the sculpture work. The architect for the building is Mr. T. W. James, of Salterton, Devon, whose design was some time since selected in a limited competition. The contractors for the work now commenced are Rian and Sons, of Dudley and Birmingham, whose tender for £51,000 has been accepted.

SALFORD.—On Friday last, a new building, intended for day and Sunday schools, was opened. The lecture hall will accommodate an audience of 300 on the floor. It has a small gallery, and on either side of the large room are ten class-rooms. There is also a roomy, well-ventilated, cheerful room for the infant class. The cost has been £3500, of which £2400 has been already obtained. The architect was Mr. J. Lowe, and the builder Mr. W. Southern.

SHIPLEY.—New Independent schools are about to be erected on a site alongside the turnpike road leading from Bradford to the market place, Shipley. 1700 yards of land have been secured for this purpose, and Messrs. Knowles and Wilcox, architects, Bradford, have been commissioned to prepare plans for the schools, which have been approved and let by contract for the sum of about £1350, but the total outlay, including land, will be £2500. It is proposed, at some future time, to erect a chapel to the front of the road, and therefore the schools will be placed in the rear. As the schools will be hidden from view when the chapel is built, the design is of a plain character. The schools are to be two stories in height, the external dimensions being 76ft. by 36ft., approached from the road by an 8-foot walk. The upper floor, 72ft. long by 32ft. 6in. wide and 15ft. in height, will be used as a preaching room, affording sittings for 400 persons.

THE INSTITUTE CONVERSAZIONE. — The annual conversazione of the Royal Institute of British Architects for 1870 will be held at the rooms of the Institute on Wednesday, the 22nd of June. Members who may be willing to contribute pictures or works of art for exhibition on this occasion are requested to communicate at once with the assistant secretary, who will make arrangements for the conveyance and reception of such articles.

WINCHESTER.—The committee engaged in attempting to start a School of Art in this city have found sufficient prospect of support to make it seem desirable to proceed immediately with the necessary steps for that purpose, and propose that a public meeting should be held in the course of the next week.

OPENING OF THE EMBANKMENT RAILWAY.—On Monday morning this new line, which has been so long in progress, was opened for public traffic for the first time. The opening was quite unexpected, the general belief being that it would not be fit till Wednesday. Nevertheless, considering how little the fact was known, there was a fair amount of traffic, which no doubt will now increase every day. There are four stations—one at Blackfriars, one at the Temple, one at Charing-cross (Hungerford), and one at Westminster-bridge, whence the line runs on to Brompton and Kensington, and so on into the main metropolitan circle. The line is admirably built and excellently ventilated, for the faults which exist in what may be called the underground section to Paddington have been remedied by the practical experience gained in that portion. The stations, above all, are lofty, cheerful, and open to the air—in fact, the very reverse of those on the underground line. Much carpentering work remains to be done at the stations, but this is not much more than the matter of a week or so, when they are to be finished in the best style, with waiting and refreshment rooms. The run from Blackfriars to Westminster takes a little over four minutes.

CURIOUS TENDERS.—The curiosities of "tendering" for building contracts have often been remarked upon, and a notable instance is recorded Messrs. Newton, Chambers, and Co., invited tenders for the erection of fifty new cottages at Thorncliffe, when sixteen proposals came in, ranging from £5420 to £2421. The difference between the highest and lowest tenders was actually greater than the sum for which the work has been let.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

RECEIVED.—J. R. D., W. W. H., W. F., E. F. R., J. F. Stant, J. Adams, E. Hoole, S. A., T. W., J. H. J. W. T., Rev. E. G., J. N. J. H., N. T., F. R. A., W. F. H., J. M., Enquirer.

W. W.—With description of tower of Desecrated Church.
N. M.—"Rollin's History."
PUPIL.—Write the Secretary of the Royal Institution of British Architects, 9, Conduit-street, W.
THOMAS MARSHALL.—Drawing declined and returned.
W. SUTHERLAND.—With MS. to folio 58.
WM. BINGLEY.—With sketch of Hedon Church doorway.

Correspondence.

ARCHITECTS AND THEIR CLIENTS.

(To the Editor of THE BUILDING NEWS.)

SIR,—If I wish to build a house, the first thing I do is to select an architect. I am told Mr. Jones is a very clever man, I therefore employ him.

Plans are prepared and tenders invited and accepted. The works are begun and completed. The contractor removes his plant, and receives the balance of his account. *The architect first having certified the works to be complete*, all the drawings are taken away, and the architect receives his commission. So far so good.

The next thing is, I get into my house, and before I have been in six months I find to my disgust, the drains are out of order, and I get nearly poisoned in consequence; the bells won't ring, the gas escapes, &c., &c. I ask in dismay, what must I do? and am told the drains must be opened and put right; the bell wires have stretched, and must be shortened; the gas pipes, I am told, ought to have been painted before being fixed, and I must have them taken up and done at once.

Now having no drawings in my possession, I am bound to call in Mr. Jones again, much against my inclination, considering, as I do, that he and he alone ought to be responsible for all these defects. But is he responsible? Alas, no! I find I must pay him again. Now, sir, if I am unwell and require medical advice, I go to a physician, he examines and prescribes for me; I pay the fee of say two guineas; I take away the prescription, *which is my property*. I can use it at any future illness, at any time, either for myself or anyone else.

Now why should this paper be mine, and the drawing of my house not mine, seeing that I pay for both?

My impression is clients should take the matter in their own hands, and make it a part of the agreement that the drawings should become their property; and then they would not be left at the mercy of the architect, be he who he may.—I am, &c. JUSTICE.

Windsor, June 1st, 1870.

BUILDING NEWS SKETCH BOOK.

SIR,—Will my drawing of Cross for "BUILDING NEWS Sketch Book" be published? I have noticed that a very few of those already given are accompanied by measurements or details. Then, again, looking at them artistically, their effect has been to a great extent marred by their being so carefully lined up with mathematical instruments and conventionally shaded. This is very well for new designs, but the hand alone can give the picturesque outline of the grand old buildings of centuries ago. As to shadows, I think some of Mr. Street's bold touches might be studied with advantage. The gist of all this is that I should define a sketch as a drawing made on the spot and not touched afterwards, filling up any spare space with noticeable details or measured plans.—I am, Sir, &c., J. ROMILLY ALLEN.

75, Huskisson-street, Liverpool, May 14, 1870.

[Mr. Allen's sketch will appear in due time.—ED. B.N.]

LAMBETH PALACE.

SIR,—The Lollards Tower at the Palace of Lambeth, one of the few antiquities yet remaining to the metropolis, is, I regret to say, in the hands of destroyers. In other words, it is being *restored*. Those who are interested in the con-

servation of our old national buildings should look to it. It is said to be in contemplation to transform the interior, and to convert it to the purposes of a charitable institution. To saturate the external stonework of this venerable relic with a preserving wash or composition, and stop the further progress of decay, would have been well—to recase it with new stone is *destruction*. —I am, Sir, yours, &c. M.

A CORRECTION.

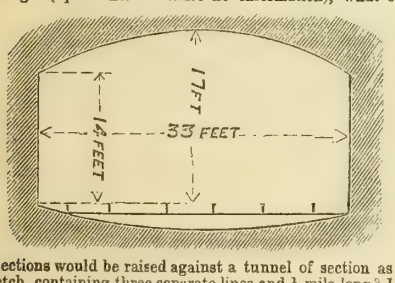
SIR,—There is an error in my letter as it appeared last week, which I should be glad to see corrected, as it materially affects my meaning. The passage should stand so:—"The extract from Dr. Smith's work amounts to this, and which is similar to the statements of Dr. Lübke I find, that the Athenians made such refinements," &c.—the extension of my knowledge having reference to Dr. Lübke's book, not to Athenian architecture.—I am, Sir, &c., P. E. M,

Intercommunication.

QUESTIONS.

[1863.]—LAYING CELLAR FLOORS IN CEMENT.—I am about building a house in the country, and as there is gravel in the ground and good hydraulic lime not far distant, (Doncaster), I purpose laying the cellar floors with a 3in. bed of concrete, and finishing with a skim of mortar. I suppose this method will be cheaper and more impervious to wet than brick flat paving. But as I am a stranger to the process and do not know how the bright surface is obtained which I have seen on the cement flooring of the continent. I shall be obliged if any of your correspondents can give me any hints as to the process of laying, and if the finishing coat of lime is mixed with any other material.—A. BEAVER.

[1864.]—RAILWAY TUNNELS.—Will any of your readers be so good as to inform me whether the minimum clear height under railway arches fixed by law (14ft.) applies also to tunnels? If not, what is the minimum Parliamentary height required for tunnels? Not touching the question of strength (upon which I desire no information), what other



objections would be raised against a tunnel of section as per sketch, containing three separate lines and ¾-mile long? I am aware that such a tunnel would be lower than usual, and of different form.—HORSHAM.

REPLIES.

[1852.]—BACK BOUNDARY WALL.—As for the red brick wall being in keeping with the 14th century work, it is not worthy of consideration in comparison with the grand effect it will give as a picturesque background to the stone house, particularly if the boundary wall be a considerable height; then with bands of other coloured bricks introduced, say blue glazed, dead black, white or yellow stock, and any other colours obtainable, the design would be all that could be desired by the most sanguine art critic.—ALPHA.

[1854.]—SIZE OF OVERFLOW PIPE.—It should be sufficient to carry off the water that may fall upon the roof during the heaviest rainfall. An inch in depth in an hour would be a reasonable quantity to make provision for, although greater falls of rain than that have occasionally occurred. The roof area being 1500 square feet the quantity of water that would have to be provided for would be 125 cubic feet per hour, or a little more than 2 cubic feet per minute. The mouth of a pipe to take off this quantity at any given depth, say 1in., would be found by considering it as a weir, and applying the formula applicable to the flow of water over weirs, which is, that the quantity of water passing over the weir in cubic feet per minute is equal to five times the square root of the cube of the depth in inches, multiplied by the length of the weir in feet; or, calling such quantity q, the depth d, and the length l, $q = 5\sqrt{d^3} \times l$, and l, of course, becomes $= \frac{q}{5\sqrt{d^3}}$. If $q = 2$ and $d = 1$, the length l, or the circumference of the mouth of the pipe, will be $\frac{2}{5}$, $= \cdot 4$ft. $= 4{\cdot}8$in., which is the circumference of a circle whose diameter is 1·53in., or say 1½in. Below the mouth of the pipe the diameter may be slightly reduced. But overflow pipes to cistern within houses are dangerous things if connected with drains or sewers, for they form outlets for the foul air of the drains, which accumulates about the cisterns and spreads into the house and frequently causes illness. To "trap" the pipe by making a bend in it is not safe, because the water in the bend evaporates and allows the foul air to pass, and the frequency of the overflow of water cannot be depended upon to counteract the evaporation.—C. S.

WATER SUPPLY AND SANITARY MATTERS.

A notice has been issued to the inhabitants of Bradford and its neighbourhood advising them to be cautious in the use of water, as, in consequence of the drought, the supply is not very plentiful.

STAINED GLASS.

SHEFFIELD.—The chancel of the ancient parish church of S. Peter, Sheffield, has just been enriched by the insertion of a new stained glass window on the northern side, as a memorial to the late Mr. W. Rowley. The window contains representations of "Moses and the Tables of the Law," "Elijah at the House of the Widow of Zarephath," "Daniel in the Lions' Den," "David with his Harp," "Our Lord arrayed as the High Priest," and "S. John on the Island of Patmos," with the emblems of the Trinity. The window is by Messrs. Ward and Hughes, and is from a design by Mr. R. Drury. The adjacent window will also shortly be filled with stained glass.

STATUES, MEMORIALS, &c.

WESTMINSTER ABBEY.—On Tuesday afternoon the statue of Lord Palmerston, which had been erected for some days past in the position allotted to it in the north transept, was unveiled. The monument stands immediately above Lord Palmerston's grave, and faces the monument of George Canning. The figure has been executed by Mr. Jackson. The veteran statesman is represented in the robes of the Garter, and as standing in a meditative attitude.

BUILDING SOCIETIES.

ATHENÆUM BUILDING SOCIETY.—The Athenæum Building Society, Birmingham, has failed, with liabilities amounting to nearly £8000. There is due to depositors £7130, and to shareholders £619. The business will probably be transferred to another society, and the shareholders will get about 15s. in the pound.

BRISTOL AND CLIFTON PERMANENT BUILDING SOCIETY.—The sixth annual meeting was held on Monday. From the report and balance sheet read by the secretary it appeared that the society's operations had been as successful during the past as the preceding year. The chairman and vice-chairman, in proposing the adoption of the report and balance sheet, congratulated the members on the continued success of their labours. A few weeks ago the board found money flowing in rather faster than they could invest it, and they were led in consequence to reduce the rate of interest on debentures to 4½ per cent., but at the monthly meeting just held they had agreed to advance over £5000 on very unexceptional security, and from the applications being made, were not likely very soon again to suffer from a too great abundance of money, for the society was becoming well-known and appreciated.

LEGAL.

RIGHT OF WAY ALONG EMBANKMENTS OR SEA WALLS.—THE GREENWICH BOARD OF WORKS *v.* MAUDSLAY.—The question here raised was whether the Commissioners of Sewers have a right to stop a public right of way over an ancient sea wall or embankment against the sea. There was evidence that from time immemorial a public way had been used along the top of the embankment in question. Nevertheless, the Commissioners had stopped it, and the question was whether they were justified in doing so. After an argument of some duration, in the course of which Mr. Justice Blackburn asserted that some of these sea walls were probably as ancient as the time of the Romans, the Court gave judgment for the appellant in favour of the right of way. The Lord Chief Justice, in pronouncing judgment, said that the power to protect the land from the sea was one of those things which emanated from the prerogative of the Crown for the general safety of the public; and no doubt rights of property or rights of way must give way to that which was done under that great prerogative, but only to the extent to which it was necessary for the public safety; and if the right of property or right of way could be exercised consistently with the public object, then it need not be interfered with. Here it appeared that the right of way, which, for aught that we know, had existed long before the sea wall itself was erected, or had been used and enjoyed ever since it was erected (which might have been as long ago as the Roman Empire in this country) could be exercised by the public quite consistently with the discharge by the Commissioners of Sewers of their duties. If it was otherwise, then, as already stated, the particular right must have given way, but until it was otherwise there was no reason to interfere with the exercise of that right, and therefore the Commissioners were not justified, and there would be judgment against the Board. The other learned judges concurred. Judgment for the appellant.

A BUILDER'S RIGHT TO ERECT A HOARDING.—BRASS *v.* THE COMMISSIONERS OF SEWERS.—Mr. Mellish, Q.C., moved for a rule calling on the Commissioners of Sewers of the City of London to show cause why a writ of mandamus should not issue commanding them to grant to Mr. Brass, the contractor for the erection of the new Post Office, a license to construct a hoarding around the land on which he is about to build the new premises. At the outset of this great undertaking preliminary questions arose with reference to the form of license Mr. Brass was entitled to. There were three questions in dispute: first, the new building would face four streets—St. Martin's-le-Grand, Newgate-street, Angel-street, and Bath-street, and the hoarding would be continuous. The maximum fee for a license for a hoarding in any street was £10, but to that amount no objection was raised. The second point was whether the Commissioners of Sewers had a right to make an arbitrary rule that the license should be renewed every two months, and that a license must be taken out for each street. In this case the building would take two years to erect, and if the Commissioners' contention was correct Mr. Brass would have to pay the sum of £480. The Lord Chief Justice.—On what principle do the Commissioners limit the license to two months? A common house would take a longer time than that to build. Mr. Mellish said the only principle he could understand was the principle of multiplying fees. The third point was whether Mr. Brass could be prohibited from using the hoarding for advertisements, that having been held out in the Government tenders as a source of profit. If not Mr. Brass would have a claim for compensation from the Government. Mr. Brown, Q.C., appeared on behalf of the Commissioners of Sewers, and showed cause in the first instance. That body acted only for the convenience and safety of the public, and they only exercised the discretion vested in them by Act of Parliament. The practice hitherto had been to charge a double licence where a house was rebuilt at the corner of two streets, and in this case the building would be surrounded by four streets. The Lord Chief Justice said the Commissioners of Sewers must use a reasonable discretion, but to exact a license renewable every two months was most unreasonable and unfair. This was a continuous hoarding, and could only be charged as one license. They, of course, had to exercise a discretion as to time, and see that a hoarding was not kept up longer than was actually necessary. Mr. Justice Mellor said if these rules had applied to the spot of the new Courts of Justice it would take a sum as large as the national debt to pay for the licenses. Mr. Brown said the third point was the most important. Mr. Brass had let the hoarding for advertisements at £1 per day, or £365 a year. The Commissioners wished to prevent its being used as an advertising medium in the interest of the safety and convenience of the public. There could be no doubt that people standing admiring the pictures was a serious obstruction to the thoroughfares. The Court had, no doubt, seen them—such, for instance, as a lady with flowing hair. Mr. Justice Mellor.—She looks very much like a Queen's counsel in his big wig. (Laughter.) The Court held that the Commissioners must grant Mr. Brass one license, and for the period required for building the new Post Office. They had no right to force him to take out four licenses renewable every two months. They had no power to lay down conditions as to advertising. Rule absolute, and a mandamus peremptory.

LOCAL BOARDS' NON-LIABILITY.—No action for damages sustained by an individual in consequence of the want of repair of a highway, will lie against a Local Board constituted under the Public Health Act, 1848. Where therefore, as in the case of Gibson *v* the Corporation of Preston, the plaintiff sustained a personal injury in consequence of a road which was within the limits of the jurisdiction of the defendants (who were a Local Board) being out of repair, and he therefore brought his action for the recovery of damages, it was held (says a legal correspondent) by the Court of Queen's Bench that such action could not be maintained.

Our Office Table.

VIEILLE-MONTAGNE ZINC.—The Vieille-Montagne Zinc Mines and Foundries Company increased its production of zinc last year to 43,036 tons, as compared with 40,216 tons in 1868, 36,260 tons in 1867, 31,722 tons in 1866, and 30,592 tons in 1865. This great production, which amounts to 30 per cent. of the whole zinc production of Europe, would not have been attained merely with the minerals obtained from the company's own mines, but the directors supplied, to some extent, the consumption of the company's furnaces by means of purchases made abroad. The sales effected by the company on the various European and over-sea markets have followed the progress of the production, having amounted last year to 44,441 tons, of which 37,957 tons were zinc, properly so called. In the total of 37,957 tons, France alone figured for about half, Germany, Belgium, and Holland for one-fourth, and England, the United States, and other over-sea markets for the other fourth. The selling price of zinc last year was below that of 1868, but this element of loss was compensated for by a greater production and economies realised in the manufacture. Among the general causes which for several years past have tended to occasion a decline in the price of zinc, we should mention the great production of calamines in Sardinia, which has augmented, by more than 20,000 tons per annum, the general production of rough zinc in Europe during the last three years, and has disturbed the equilibrium which formerly existed between the production and consumption. The net profits realised by the company amounted last year to £124,846, and the dividend for 1869 is 16s. per share, absorbing £90,000. This dividend shows some little improvement upon that paid for 1868, and the company's position seems to have improved generally during the last 12 months.

INDUSTRIAL SCHOOL, ECCLES, NEAR MANCHESTER.—The competition for the above schools has been decided. After the committee had given much attention to the designs, the Government Inspector was consulted, and pronounced in favour of No. 8. On breaking the sealed envelope the author was found to be Mr. Edmund Kirby, architect, of Liverpool, who will be entrusted with the carrying out of the works.

VALUE OF LAND IN WALWORTH.—A further portion of the Walworth Common Estate, belonging to the parish of S. Mary, Newington, has been cleared, and a number of huts, of the most wretched description, have been swept away. The narrow, filthy lanes, locally known as "Sweep's Alley" and "Nurse's Court" have disappeared, and a new street, in a line with the road through Surrey-square, is being laid out. Fifty-one building plots, fronting to or abutting upon this new street, were let by auction by Messrs. C. Stuart, Barker, and Son, at the Elephant and Castle Tavern, on Monday last. There was a very large

attendance, and the prices realised are unprecedented in this locality. The lots cover about an acre and a quarter of land, and the ground rents reached a total of £494 10s. per annum. This is at the rate of £395 12s. per acre, which capitalised at 25 years' purchase gives £9890 per acre as the value of the fee simple. The lease which has just expired was granted 92 years ago at a ground rent of £3 12s. per acre. If we capitalise this in the same way at 25 years' purchase, it gives £90 per per acre as the fee simple value in 1778. During the last 90 years this land has therefore increased in value more than a hundred fold.

THE LATE MR. W. ANDREWS, BRADFORD.—On Friday evening last Mr. W. Andrews, senior partner in the firm of Messrs. Andrews, Son, and Pepper, architects, Bradford, expired at his residence, Little Horton-lane, aged sixty-five. The deceased was the oldest architect in the town, having been in business for thirty years, but for the last six or seven years he has lived in comparative retirement. He was a gentleman generally esteemed, had served the offices of town councillor and guardian of the poor, and has left his mark behind him in many fine buildings—banking premises, warehouses, manufactories, and residences—that now adorn Bradford. He was a native of Holme, near Howden, and had been in indifferent health for a year or two previous to his demise. His discriminating judgment in arbitration cases was held in esteem. He leaves one son, Mr. T. G. Andrews, who, in conjunction with Mr. Pepper, has latterly conducted the business.

THE METROPOLITAN DISTRICT RAILWAY.—The long and expensive Parliamentary contest between the Metropolitan District Railway Company and the City authorities was brought to a close on Tuesday. The Lords' Committee unanimously refused to sanction the construction of a line from Bread-street to the Mansion-house. The proposal of the Metropolitan Railway Company to abandon their line from Aldgate to Tower-hill was also refused, but the Committee are prepared to recommend that there should be an extension of time, if it be desired, for the completion of the works.

NEW HALFPENNY STAMP.—The Post-office authorities are said to have finally decided upon the form of the new halfpenny stamp to be used for the transmission of newspapers through the post on and after the 1st of October. The stamp will be one-third smaller than the present postage stamp, the head of her Majesty, as at present engraved on the stamps, to be reduced in a corresponding proportion. On each side of the head will be the figures "½d." in the place of the words "Postage one penny," now adopted. The stamp will be oblong, the horizontal sides being longer than the perpendicular, thus presenting to the eye a clear and well-defined difference between the halfpenny and the penny stamp. The colour selected has been light pink, that having been found after many experiments to be the most fugitive, and the most easily affected by any attempts at tampering with it. The figures denoting the value of the stamp will be left white, and the ground will be filled up with engine work, or light pink lines. The stamps will be printed on sheets of 480, representing 20 shillings' worth.

A RELIC OF THE BRADFORD MANOR HALL.—Previous to the demolition of the Bradford Manor Hall, the hope was expressed that the Elizabethan doorway, with its quaint carvings, and bearing the arms of the Rawson family, should be preserved. That hope has been realised. The doorway, and other portions of the old building, were presented to the Corporation. Messrs. Lockwood and Mawson, architects, prepared an appropriate design for the utilising of the doorway, and it has been erected in its entirety in Peel Park, forming a covering to the drinking fountain adjacent to the lower lake. The doorway has been framed in a neat little building, about 16ft. in height, the internal dimensions being 4ft. 2in. by 8ft. 6in. The lion's head, through which the water will flow, is placed in a shallow niche, and over this is a carved stone, taken from the old hall, bearing the Rawson arms.

COLUMBIA MARKET APPROACHES.—A new approach to this market is now in course of formation, and will be opened in a day or two; Crabtree-row will then run direct from Hackney-road to Columbia Market. This will leave a triangular piece of ground with frontages to Hackney-road, Crabtree-row, and Union-street, in the centre of which will be erected a drinking fountain at Miss Burdett Coutts's expense, with, probably, a few trees around it. It is proposed to allow flower-sellers to lay out their flowers and plants for sale on a portion of this triangular space (free of charge or rent), thus forming a small flower market. By making Crabtree-row straight, and giving this triangular piece of ground to the public, Miss Coutts loses at least £6000 worth of building land.

"THE UTMOST RIGOUR OF THE LAW."—If, on some Easter Monday, or Monday in Whitsun week, a party of mechanics or labourers from Whitechapel were to smash some valuable works of art in the South Kensington Museum, society would expect the infliction of punishment to the utmost rigour of the law. Persons who are supposed to be gentlemen, students of Greek literature, and lovers of learning, science, and art, break into their own college library and destroy busts and statues by way of frolic. Some are rusticated, some sent away altogether, some "gated;" none are prosecuted to conviction. The parents may suffer thereby, but what do these Mohawks care for such trivial penalties as leaving Oxford without a degree?—*Law Journal.*

Chips.

Mr. Edward Wm. Drury, of the firm of Drury and Lovejoy, was the successful candidate for the district surveyorship of S. Margaret and S. John, Westminster, at the office of the Metropolitan Board of Works, on Friday last.

There is a vacancy in her Majesty's Office of Works for an assistant surveyor. The salary is £500 per annum, increasing to £700. The First Commissioner, we learn, has determined to receive applications from duly qualified persons, and to deal with them on their merits, without reference to patronage.

The Sheffield Gas Company has resolved to reduce the price of gas, supplied on and after July 1st, to 3s. 1d. per thousand feet.

The Shoreditch Vestry has, on the recommendation of the Building Committee, ordered the portion of the road fronting S. Luke's Workhouse to be paved with the Val de Travers asphalte, as laid down in Threadneadle-street.

The Poor Law Board has sanctioned the erection of a new infirmary, at the Durham Union Workhouse, at a cost of £3500.

A new infirmary is to be erected at Booth, at an estimated cost of £3500, exclusive of the land, which is given by the Earl of Derby.

About fifteen months ago the dilapidated tower of Whitfield Church, Northants, was blown down in a gale, and the body of the building being in nearly as bad a state, the whole has been rebuilt by Mr. Woodyer, architect, at the cost of £3000. The fabric was re-opened on the 24th ult.

Mr. Warrington Wood, the rising English artist at Rome, whom we mentioned in this column a few weeks since, has been commissioned to execute a bust of Mr. and Mrs. Platt for the Town-hall at Staleybridge.

The Prince of Wales will lay the foundation stone of the Reading Grammar School on Friday, the 1st of July.

A German *savant*, who has been exploring the plains of Troy, says he has discovered the ruins of Priam's palace.

There are seven female sculptors from the United States in Rome at the present time—Misses Hosmer, Whitney, Lewis (coloured), Freeman, Stebbins, Foley, and Virginia Ream.

It is stated that the Premier has consented to recommend a grant-pension of £100 per annum to the widow of Mr. Dargan, the Dublin Exhibition contractor.

The thick coats of whitewash which have been allowed to accumulate on the interior of Durham Cathedral are in process of removal, beginning at the west end of the north aisle.

The Guardians of the Durham Union have recently determined to erect an Infirmary and detached Fever Wards at the north-west end of the existing Workhouse. The tender of Mr. John Forster, jun., Durham, to execute the whole of the works for the sum of £3989 17s. 6d. being the lowest, was accepted by the Board at their meeting on Saturday last.

On the 11th instant a new Wesleyan Chapel was opened at Mark Somerset. The building, which cost £800, was designed by Mr. H. F. Price, architect, of Weston-super-Mare, in the Gothic style of architecture, and seats 300 people.

The Fine Art division of the French Commission for the London Exhibition of 1871 has four presidents:—Painting, M. Meissonnier; Sculpture, M. Guillaume; Engraving, M. Gerome; Architecture, M. Lofuel.

Timber Trade Review.

IT often happens that words are used to describe the qualities of timber which are not to be found in any dictionary, and the origin of which is obscure. Some of the following are scientific names, often used in connection with wood, but not always thoroughly understood, and others are of the class first mentioned.

Botanists divide plants into two classes, *exogenous*, which increase their growth by an annual accession of matter externally, and *endogenous*, which increase their growth by an annual accession of matter internally; so that in exogenous plants the external parts are the younger, and in the endogenous plants it is on the contrary, the internal parts which are of the latest growth. Timber trees are of the exogenous class.

Suppose we take the horizontal section of the stem of a tree and examine it. First of all at the centre we find the perfect or heart wood. As timber tree increase by accession of matter externally, it follows that this must be the oldest wood, and that the several concentric layers must be younger, in proportion to their distance from the centre

Then comes a belt of "alburnem," or sap wood, which has not yet attained to perfect maturity. The next concentric belt is termed the "liber," and this again is enclosed in the bark, the liber forming an internal coating to the bark. The centre of the heart wood is occupied by the pith, and between the pith and the bark what are called medullary rays keep up a connection. The outer covering of the bark is sometimes called the epidermis. Sap, which has undergone a chemical change by exposure in the leaves, contributes to the growth of the tree on its descent. The sap, after undergoing this curious change, is termed "cambium." "Girdling" trees in the spring (a too obvious term to need any explanation) causes them to produce timber in the ensuing winter of an increased specific gravity above the girdling. Mr. Knight, who was for several years president of the Horticultural Society, vouches for this, and so accomplished an arborist may be implicitly trusted. In one experiment he made, in which the belt of bark has been extracted for several years, he found that the specific gravity of the wood above was 0·590, while that below it was only 0·491, and also that the alburnum or sap wood had acquired a greater degree of hardness, and consequently durability.

What is called "quaggy" timber is grown in loose soils. Timber so termed is full of shakes and clefts in the centre. "Cuppy" wood is said to be cuppy when a shake extends round a great portion of the trunk, between two of the annual concentric layers so as to divide them from each other. The defect is not attributable to the soil, but is supposed to originate in the effect of frosts on the aqueous sap in its ascent.

"Rind gall" is caused by the alburnum of a tree being wounded, or a branch being improperly lopped or damaged. The subsequent growth of the tree will cover it, and it is then called a rind gall, which, should the injured part have had time to become decayed, or partially so, or even sodden with the rains, will frequently cause an excessive rottenness in the plant. This is remarkably the case with elm timber. "Doatiness" (probably "dottiness") is a spotted or speckled, appearance like small stains in the wood. This disease is most common in American yellow pine beech and American oak. It is, in fact, incipient decay.

Foxey timber presents a dull red appearance, quite unmistakable when once seen. Such wood is soon ruined when once attacked, and sometimes, as in doated wood, the surface fibres can be scraped away with the thumb nail.

"Shakes" and "wane" are too much in use to need explanation.

The Liverpool timber market is rather bare of Baltic goods. The following prices are asked:—

Holmsund and Husum yellow, per Petg. std., £7 10s. to £9.
Petersburg do., £10 to £11.
Do. short lengths, £7 10s. to £9 10.
Quebec best yellow pine, £17 to £19.
Do. 3rd, £7 10s. to £9.
Do. spruce, £7 5s. to £7 10s.
S. John's spruce, £6 10s. to £6 15s.
Dantzig lathwood, per fathom, £4 10s. to £4 15s.
Jamaica logwood, per ton, £4 10s. to £5.
Campeachy do., £10 10s.
Tobasco do., £8 5s. to £9 10s.
Spanish, Tobasco, and Honduras fustic, £5 10s. to £6 5s.
Jamaica, £5 to £6.
Cuba, £9 5s. to £10.
Nicaragua wood (solid) £12 and upwards.
Do. (small) £5 to £7.
Lima wood, £11 to £13.
Barwood, £4 5s. to £4 10s.
Sapan wood, £8 15s. to £11.

At Auckland (New Zealand) building materials are selling as follows:—

Bricks, per 1000, £2 15s. to £3 5s.
Countess slates, per 1000, £13 to £14.
Morewood's corrugated iron, per ton, £28 to £29.
Other brands, £27.

From Otago the following are the last quotations:—

3 × 9 Baltic deals, either yellow or white, per foot run, 5¼d. to 5½d.
3 × 9 white spruce, 4⅝d. to 5d.
1⅛in. flooring boards, per square, 22s. 6d.
Other sizes in proportion.
Countess slates (are very scarce) per 100, £1 .
Portland cement, per barrel, 22s.

THE BUILDING NEWS.

LONDON, FRIDAY, JUNE 10, 1870.

THE ARCHITECTURAL EXHIBITION IN CONDUIT STREET.

(*Continued from page* 406.)

MR. F. PECK is the contributor of two effective drawings, Nos. 86 and 95, of large and important works, representing the county prison for Lincolnshire, now in course of erection near Lincoln, and the Suffolk County College. With regard to the prison, it would appear to be arranged with due regard to sanitary and other requirements, but to have an affectation of a mimic Castellated style, which had better have been avoided. The strictest utilitarianism in such structures will generally produce the best and most appropriate effect. The Sussex College seems, as far as the view, unaccompanied by any plan, is concerned, to have little beyond size to recommend it. Architecturally, its merits are of third-rate order; neither grouping nor detail are satisfactory.

Mr. William Lee has provided us with better food for reflection. No. 88 is an interior view of his premiated design for the large hall for the Manchester Town Hall. It is a good pen-and-ink drawing of what would have been a noble apartment, though somewhat over ornate. We shall rejoice, however, if the one about to be built be equally meritorious.

Nos. 93 and 94 are exterior views of the same design, but far inferior, as being less simple in general design and still more overdone with ornamental detail, and that detail being far from satisfactory.

No. 99 is a study for the decoration of the large hall. Though careful and meritorious, and we may say harmonious in effect, it is not particularly original. The design for the painted glass is poor, and the figure subjects in the roof too small in scale. The whole seems an imitation of Mr. Scott's work, of which the world possesses quite enough without its repetition in copies. In No. 157 Mr. William Lee has left the realms of fancy for those of sober fact, but this design (one of the two selected for the Lincoln and Nottinghamshire Schools) is very third-rate. His namesake, Mr. Ernest Lee, in his prize design for a railway station, which obtained the Soane medallion, (Nos. 110 to 113) has followed after another modern master—Mr. Burges. We do not think his lopsided elevation to face the Thames would be much better than those we have been favoured with by the railway engineers, but the side view of the building is very satisfactory. The detail, of course, is a version of Early French Gothic, of which the quietness and simplicity is a relief after the crocketted repast we have just discussed; but the stumpiness observable in the work of this as of other adherents of the all head and no body style is an affectation which is offensive.

Mr. George Truefitt sends but one drawing, No. 90, a highly-characteristic one. It is a view of S. George's Church, Tufnell Park, erected in 1861. It is quaint, original, and economical—three good qualities—but it is, to our mind, horribly ugly. The plan is octagonal, with a brick arcade, having stone springers carried on iron columns dividing a central area from a surrounding aisle, a circular projecting apse with lateral excrescences on the eastern side. Mr. Truefitt's drawing, it is easy to see, is his own.

Mr. Henry Dawson has a large and elaborately coloured drawing of his great building the London Orphan Asylum at Watford. It is a town in itself, and not unpicturesquely grouped, but its other architectural features and detail are very mediocre, though pretentious.

A far better and a quietly and well-arranged group of buildings is that by W. Milford Teulon and E. Evans Cronk (No. 92)—a design in pen and ink for Convalescent Home, Saltburn-by-the-Sea. The only part which strikes us as needing revision is the upper part of the central turret. Mr. W. M. Teulon also exhibits four other drawings, specimens of architectural colourists' work, Nos. 200 to 203. The most important of these is the large mansion built for Lord Overstone in Northamptonshire, which, though in a corrupt style, is stately and picturesque. Frogmore, near Hereford, is more to our taste, and has the modest, while effective, aspect of an old town mansion. We cannot say so much for Long Hall, a house built near Guisborough, where the attempt to combine modern requirements with a few Elizabethan features is not happily effected.

Mr. James Brooks sends (No. 96) south-west view of Christ Church establishment, Clapton, and (No. 97) the interior of the same church—pen-and-ink drawings more careful than masterly. They hardly do justice to this really fine group of buildings. The church is stately and dignified, but the curious iron sort of birdcage for a bell turret is not in keeping.

Mr. T. Chatfeild Clarke's miserable, while pretentious, Congregational Church (No. 98) suffers sadly by contrast with the above. Mr. Clarke is apparently more in his element, though that is but a prosaic one, in No. 174, design for a City building.

Mr. Crossland has sent one good drawing which we have overlooked (No. 45), the interior of Christ Church, Staincliffe. It is sumptuous and stately, and of a fair ordinary type.

Messrs. Carter and Lyon send three drawings, neatly executed in pen and ink, of additions to Cowhill Church, Dumfriesshire. The plan seems a good one, and the elevations in the Scotch Baronial style picturesque and well treated. The men-servants are labelled dangerous by being stuck into a perfectly isolated tower like a keep, which seems rather like affectation.

Mr. Robert Miller has sent a huge drawing, labelled "Government Buildings," in a wretched style of Batty-Langley-like Gothic that, we trust, may never be foisted upon any Government, even in the antipodes.

Mr, H. Florence sends his creditable gold medal design for a theatre. It is exquisitely tinted in the French style of drawing.

Mr. H. W. Lonsdale also contributes a well-drawn and tinted design for ball and concert-rooms in Early French Gothic, free from extravagance.

Messrs. Henry Jarvis and Son's design (No. 125) for S. Stephen's Church, Walworth, now being erected, is infinitely better than their unsuccessful competition drawing before referred to. We do not like the top of the tower, but otherwise that portion of the building and the principal porch are good. There is a great falling off in the chancel.

Messrs. W. Fogerty and T. Drew send three drawings of new municipal buildings, Belfast, which seem conveniently arranged. The style is Classic, and would pass except for the mansard roofs and other parts above the main cornice, which are but little in keeping. Messrs. Fogerty and Drew appear in another character in No. 161, design for Guildhall and public offices, Plymouth, an effective but over ornate Gothic building.

No. 154, Eign Brook Congregational Church, Hereford, by G. Haddon, is another pretentious but poor specimen of its class.

No. 156 is a view of the mansion lately erected for Sir D. C. Marjoribanks by T. H. Wyatt, in Park-lane—a stately building in red brick and stone, unobjectionable in mass but not so in detail.

No. 159, Berkshire Lunatic Asylum, now being erected at Chelsea, near Wallingford, by C. H. Howell, is tolerably successful and cheerful looking. The recessed buildings have the roofing unpleasantly pushed down on to the top windows, which ought to have dormers, and the top of the tower would be improved by the omission of the excrescences at the angles and the raising up of the roof.

No. 160, a proposed mansion in Argyllshire, by John Honeyman, jun., is satisfactory in effect; from the point of view chosen, the tower needs additional height.

No. 168 hardly shows to advantage Mr. I'Anson's creditable premises of the British and Foreign Bible Society in Blackfriars, nor does No. 169, the interior of hall and staircase of the same, promise much in the way of decoration.

Mr. C. Ellison sends three competition drawings of a Legislative Hall for Douglas. The design is peculiar, and would be effective, though extravagant. Its effect, however, depends upon its castellated character, which is an anachronism. The turrets and loop-holes would be useless and out of keeping with the ordinary sized window openings he has been compelled to introduce, and nothing but great scale could carry off such a skyline, whereas the larger part of the building appears to be one story above a basement. No. 179, by the same architect, is another overdone competition drawing.

Messrs. M. E. Hadfield and Son send a fine drawing of a noble building (No. 173), Great Northern Station Hotel, lately completed at Leeds. As we criticised its features at length last year, when a photograph of it was exhibited, it is needless to do so again.

We have given our opinion of the decorations of the Teatro Massimo at Palermo, by Messrs. Green and King, in reviewing the architecture at the Royal Academy. A plan of the ceiling and section of the building are here shown in Nos. 175 and 176.

In No. 177 Messrs. Giles and Biven exhibit a drawing of a monster establishment they are about to erect for Messrs. Brandon at the corner of Oxford and Cavendish-streets. As usual with shop architecture, a massive structure seems poised upon glass. This is utterly destructive of proper effect, and much to be regretted in this instance, as the pseudo-Classic style adopted is on the whole otherwise well treated. Mr. Giles also exhibits a nicely-treated Italian villa (No. 184), Highfield House, Gloucester.

Mr. George Aitchison sends a careful design for entrance gates, Montalto, Ballynahinch, Ireland, which we should have thought better suited for a London park than for a locality with such an outlandish name, and where we should think the ten fountains shown projecting from the piers an unnecessary luxury. The details are classical and delicate, but there is little in the spirit of the whole affair to justify, in our opinion, its cost. Mr. Aitchison's designs for furniture and decoration, to which we hope to refer, are much more to our taste.

We cannot admire Mr. J. J. Cole's drawing (No. 180) of buildings in Throgmorton-street, which are commendably simple and unobtrusive. Such criticism would be by no means applicable to its neighbour No. 181, a careful drawing, by Mr. Henry Hall, of the elaborate Renaissance church of S. Trinité, Paris, by M. T. Ballu. It is Parisian, and we seek no importation of its character into England.

No. 182, new premises for the East India Railway Company, by T. E. Knightley, is a nice pencil drawing of a modest-looking façade, treated with some novelty of detail.

Mr. Knightley also sends another pencil drawing (No. 183) of his premiated design for the Concert Theatre, Agricultural Hall, Islington.

Mr. E. C. Robins sends two disagreeable-looking drawings of a pretentious but ugly building (Nos. 188-89), Clapton Park Chapel. They are, unfortunately, the selected ones. Mr. Robins is apparently more fortunate in pleasing committees than he has been with us—judging also by No. 193, which presents two designs, said to be the premiated ones, for the Salisbury Bank, and No. 195, premiated design for S. Pancras Infirmary.

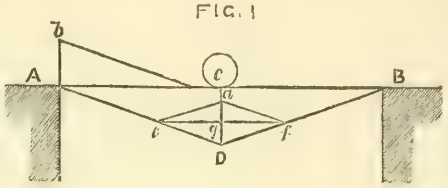
Mr. Marrable has sent here an interior view of his new church of S. Peter's, Deptford. It is an elaborate and highly-finished drawing. We have already expressed our opinion of the building in reviewing the designs at the Royal Academy. We have here the triple chancel arch—a novel and not bad feature, and the vaulted chancel and aisles, which form the best part of the church; the pulpit is pretentious and ugly.

We have now completed our inspection of the architectural drawings which set forth the designs of buildings erected or contemplated; and although it is not to be supposed that nearly all the buildings of importance of the day have been attempted to be shown here, we have no reason to be dissatisfied with the number. All that we really have to regret is the paucity of the visitors to the gallery, and the apparent waste of labour on the part of the exhibitors. They pipe cheerily, but few respond, and it pains us much that in some cases we have had to carp at the piping, seeing that the appreciation of their professional brethren is the only reward they can expect. Still, whatever is worth doing is worth doing well; and the better the result the more chance there is of at last enlisting the sympathy of the public. We have not yet by any means exhausted the contents of the exhibition, as there are some very interesting designs for decorations of various kinds, photographs of buildings, and a large and valuable series of architectural sketches, to which we hope to be able to devote some attention.

TRUSSED GIRDERS.—III.

WE have reserved for a concluding article the demonstration of the geometrical or graphical method of obtaining the amount of strain induced upon the different members of a trussed girder. So far, our investigations have been confined to ascertaining the strain upon the centre or any other part of the balk or beam that is trussed, and pointing out the general manner in which the tie rods are affected. The conversion of a thrust or compressive strain into a pull, or one of a tensile character, and *vice versa*, will be easily understood from the diagram and explanation already given. The same system will be followed in the present investigation as has been adhered to in former ones—that is, the general principles will be first elucidated, and then they will be applied to the example selected. The identity of the results of the calculation will be a check upon their accuracy. It is not to be supposed that an absolute identity, numerically speaking, will be established, because no practical man ever expects such a close agreement will ever be obtained from independent methods of analysis. In fact, when the results thus obtained agree very closely, the coincidence is in itself suspicious. There is such a thing as too good a check. Let the diagram in fig. 1 represent a skeleton elevation of the example of the trussed girder hitherto chosen for illustrating the subject. The lines are supposed to occupy the position of the geometrical axes of the members of the truss, along which it is assumed the various strains act. There is of course a little latitude allowed in practice, but it is in order to ensure the strains being transmitted in their proper directions along the several bars, that the wording of specifications is so stringent respecting the accurate drilling and punching of the holes for the bolts, cottars, and pins. It is readily seen that any error in what is termed the "centering" of these holes would throw the pin or bolt out of the line of the geometrical axis of the bar, and cause the line of strain to run obliquely across it. A bar or rod that was otherwise quite strong enough for its work would, by careless or bad workmanship, be thus rendered comparatively weak. Besides, although the effect of punching or drilling out a portion of a bar is provided for, yet there is no question but that there is a local weakness at that part, and any undue strain would be felt there more severely than elsewhere. It should be borne in mind that where the bars are undergoing a tensile strain, and have holes punched in them, the area of the hole is always deducted from that of the bar in estimating the actual area available for calculation. The former is called the gross,

FIG. 1



and the latter the nett area. As an example, suppose we had a bar $3'' \times \frac{1}{2}''$ with a hole in it three-quarters of an inch in diameter. The gross area would be one and a-half square inches, but the nett only one square inch, because the area of a hole three-quarters of an inch in diameter is practically equal to half a square inch.

To return to the diagram in fig. 1, in which a trussed beam is represented supporting a weight at the centre, and it is required to determine, by the graphic method of analysis, the amount of the strains upon its various members. From what has been already stated, it is known that the weight is transferred to the points of support A A in equal portions. Were A B a plain balk or beam without any trussing, the two portions of the weight could only be conveyed to those points by the beam itself. In the present instance the case is different. In our last article the rationale of this apparent process of transference was explained by a diagram, and we shall not therefore recapitulate. The strut C D obviously sustains, in the first instance, the whole of the weight at the centre of the beam, and since it is vertical, the strain upon it is not modified by any change of direction, and is therefore equal to the weight imposed upon it. This premises that the strut is not long enough to be affected by any bending action, which, as we have already stated, would vitiate the whole theory and practice of trussed and braced beams. Calling W the weight at the centre of the beam, and S the strain upon the strut, we have $S = W$. If the strut be composed of any material of which the safe working compressive strain per square inch of sectional area is known, let this strain be called C, and the number of square inches of material N will be given by the equation $N = \frac{S}{C} = \frac{W}{C}$. This value for N is its nett value, after deducting all bolt, pin, or other holes that may have been required for connecting it with the other parts of the truss. The strain upon the strut C D may be thus said to have been obtained by inspection, which simple method is not applicable to the rest of the problem. To find the strains upon the tie-rods and beam, make a D equal to the weight W, at the centre. From the point a, draw $a\ e$ and $a\ f$, parallel to the tie-rods B D, A D respectively, and meeting them in the points e and f. If the lines $a\ e$ and $a\ f$ be measured by the same scale as a D, they will give the strains upon the tie-rods B D and A D. In this case these strains are equal, for two reasons—firstly, because the weight is situated exactly at the centre of the girder, thus making the leverage between it and each support equal; and secondly, because the tie-rods are inclined at the same angle to the strut. Both the load and truss are symmetrical, and the strains upon one-half are identical with those on the other. The strain upon each half, A C and B C, of the beam is found by drawing the line $e\ g\ f$ parallel to it. Either $e\ g$ or $g\ f$, measured on the same scale as before, will give the amount of the strains. It must not be forgotten that these strains are referred to the centre C, where the strain is equal to $e\ g$ or $f\ g$, but not to both, as might seem at first sight to be the case. This will be understood when it is seen that one of these forces acts in precisely the same manner as if C were a fixed point. If we suppose either of these forces destroyed, and C made a fixed point, it will not increase or diminish the strain upon the other half, in which one force is supposed to act. But C is a fixed point, when both pieces are acting, and therefore the quilibrium of the whole truss remains unaffected. The same result would ensue if there were two unequal forces acting at both ends towards the centre, provided the difference were not more than the strength of the material could resist. But if one strain was so very much in excess of the other that the difference exceeded the strength of the material, then theoretically the normal equilibrium of the beam would be destroyed. Motion would take place at the point C, in the direction of the lesser strain, and the whole truss would fail altogether. Referring to the triangles $a\ e$ D, $a\ f$ D, which are similar and equal, the corresponding lines in either of them will give the value of the strains sought. Thus a D is the strain upon the strut $a\ e$, or $a\ f$ that upon either tie-rod, and $e\ g$ or $g\ f$ that upon the beam at the centre.

There is still another way of constructing the diagram of forces or strains, although the principle involved is the same. Instead of starting at the centre we may proceed from the points of support, and work by the known reaction at either point. There is one advantage in this plan, that only the elevation of half the truss is required, which is frequently in large designs a matter of some importance and great convenience. The reaction at each point of support A and B is known to be equal to $\frac{W}{2}$. At the point A, make A $b = \frac{W}{2}$; draw B d parallel to the tie A D. Measured by the same scale as A b, we shall have $b\ d$ equal to the strain upon either tie A D or B D, and A d equal to the strain at the centre of the beam. The line A b must obviously be multiplied by two to give the strain upon the strut, since both reactions must in the first case be supported by the strut, before they are transferred to the points of support at A and B. In the diagram, for the sake of clearness, the scale upon which A $b = \frac{W}{2}$ is plotted is double that of a D. Consequently the agreement of the two diagrams will be shown by the length of the lines in the latter being double that of the corresponding ones in the former. The line A b is of course equal to a D, for the weight is halved, although the scale is doubled. If this principle be applied to the example given in our last article, it will be found that the strains will check with those obtained by calculation. This is the simplest description of truss that can be designed, and is not applicable to either weights or spans of any but small dimensions. We shall at some future occasion give examples of others of a more complicated and scientific character.

THE RESTORATION OF CHESTER CATHEDRAL.

THE Earl of Derby presided, on Tuesday, at a crowded meeting held in S. George's Hall, Liverpool, for the purpose of supporting the movement for the restoration of Chester Cathedral. Unlike so many noble chairmen who are hired to adorn such meetings, Lord Derby's speech was thoroughly practical, and a real aid to the cause on behalf of which he pleaded.

"I contend," said the Earl, "that to repair a building like Chester Cathedral, even at a heavy cost, and though there may be many other claims upon our purses, is a duty which we, the residents of this part of England, owe to the public. And I say that quite irrespective of the question whether, or to what extent, or how, it can be

utilised for ecclesiastical purposes. On that latter point you will, no doubt, hear a good deal before we separate. Nearly everybody who interests himself in these matters has got his own plan for utilising cathedrals, only they do not altogether agree as to how it shall be done. For my part I respect all their plans, but I shall leave them to be dealt with by those who have more experience in such discussions. What I am to contend for is that we Englishmen of to-day, with a thousand years of civilisation behind us, and with a future opening, if not before our country, at least before our descendants scattered over many countries, of which it is difficult to foresee the limits, have duties to discharge not merely to the present generation, but to posterity —not merely to this country, but to the whole English-speaking world; and one of the most obvious and most pressing of those duties is not to suffer the destruction, through carelessness or neglect, of any national memorial which, once destroyed, can never be replaced; but which, if carefully preserved, will be a help to those who, it may be 500 years hence, shall be endeavouring to search into and reproduce the past history of their race. I think we see already how, as the world grows older, the longing to penetrate backward into the remote past becomes more and more intense. It may often be in vain, it may often end in failure, seldom can it end in more than partial success, but it is of all human pursuits one of the most deeply interesting; and there are few thoughtful men, I suppose, who have not some sympathy with it. Now, of all the memorials of antiquity that of architectural work is the most durable, and that about which there can be the least deception or mistake; and accordingly we find that respect for such memorials is an universal and increasing characteristic of an advanced civilisation. If, for instance, we were to hear that any ruler of Egypt proposed to pull down one of the pyramids for the sake of the materials, there would be an outcry of remonstrance throughout Europe. Everybody would feel that the thing which it was proposed to destroy was in some sense the common possession of the human race. Well, the middle ages have left us two sets of buildings, each essentially typical and characteristic of the time that produced them—the feudal castle and the cathedral, You have comparatively few specimens left of either. They signalise an age which, with all its good and with all its evil, is irrecoverably gone, and which you can no more revive than you can resuscitate the Roman Empire. We do not, happily for our comfort, live in feudal castles, and most of our worship is carried on in buildings which bear a very remote resemblance to ancient cathedrals. The more reason, I say, why you should preserve what you have, why you should guard from destruction that which, if destroyed, you cannot re-create—the more reason why as inheritors of the past you should feel that you are trustees for the future."

The Dean of CHESTER gave a statement of facts connected with the restoration. About three years ago, when he was required to consider the condition of the building, he found it so dilapidated and disfigured that it would have been difficult for any but a skilful observer to believe that it had ever possessed either dignity or beauty. From the surveys of Mr. Christian, the architect of the Ecclesiastical Commissioners, and of Mr. Gilbert Scott, it was found that a thorough restoration of the edifice would absorb £55,000. To meet this the Commissioners had promised £10,000, on condition that vigorous and successful efforts were made to obtain the rest. Their first great public step was to hold a meeting in the Shire-hall, at which they received great encouragement, and before the end of the year 1868 their subscription list had reached £29,500. Though they had been somewhat passive during 1869, about £2000 was added to the fund, and at the end of the year they had reached the sum of £31,500. The work of restoration was commenced in the summer of 1868, but it was necessarily slow, on account of the great amount of underpinning which was required to give security to the building. Now, however, the cathedral was beginning to unfold its richness and beauty, and anyone who visited it might see for himself how worthy of admiration it was formerly, and would be again.

The Bishops of Manchester, Peterborough, and New York, and Canon Kingsley, also spoke, and the meeting was satisfactorily concluded by a vote of thanks to Lord Derby for presiding.

ARCHITECTURAL ASSOCIATION.

AT the usual fortnightly meeting on Friday evening last, Mr. Lacy W. Ridge, President, in the chair,

Mr. THOMAS BLASHILL read "A Paper on Papers." Mr. Blashill noticed the great difficulty which seems to exist in obtaining papers on professional matters, and the backwardness of persons competent to discuss them. The advantages of papers followed by immediate discussion are that you get all sides of a question put within a small compass, and even those who content themselves with listening are led to think for themselves. Most men seem to be drilled to believe anything that is told them in well chosen language. A great part of all written matter is no more to be trusted than word of mouth; the most readable part of it is written by persons not practically acquainted with the art of architecture. Quite four-ninths, by estimation, of professional papers, are devoted to the science of archæology, and the great bulk of all such papers treat rather of matters of general interest than on the art of architecture, though they have (as everything has) some bearing on the art. This is a great and growing evil. The more thoughtful men in all professions complain that while everything else seems to be remembered, the special work of their profession is forgotten.

It is absolutely necessary that a man should have close acquaintance with the humblest processes of his art if he would protect himself against being misled by clever writers on it. This can be acquired much earlier in life than is usual, for the work of life is no harder now than it ever was, the greater part of modern "work" so called being nothing but the study of other men's opinions on matters which it is every man's business to examine and decide upon for himself.

When a man is 21 he ought to have a sufficient acquaintance with his own profession to enable him to undertake all ordinary duties, and even to think and speak with judgment on less familiar matters. If a man who has been well trained is ever going to be competent, he is competent then. The greatest instances of eminent men in every department of labour are those who have become distinguished young, or who have distinguished themselves almost immediately after they turned their attention to their particular department. Life is too short for longer training than that which has always, as a rule, terminated at 21. At that age a man has got through more than one-third, and at 28 nearly one-half, his expectation of life. Earlier and closer acquaintance with practical matters would preserve us from the great danger that some one will come and pick up from under our feet the grand discoveries which every age brings forth, and for which the professors of the different arts are looking in out-of-the-way quarters, while the thing they want lies just before them. When an outsider makes some great hit, people say it is "genius;" but it is no more than "insight," acquired by observation of matters far too humble for men who do nothing but read and study at second hand. Such men can be argued out of things which are plain to anybody of the least practical experience. This insight is not to be got by reading. Reading is for the man who has already gained some insight; it may help him to more, and discussion amongst people who have not gained it is worse than useless. There are certain books written for the glorification of men who have risen from humble positions to eminence in the higher arts. These books can teach us nothing unless we want to go into something higher than architecture. But it is very curious to see how simple all the great discoveries have been to the first man who really approached the matter with the untrammelled use of his own eyes and hands. Several instances were given of persons who not merely succeeded in life, but *were the first* to start new ideas, and who did their work while professions full of the men who ought to have done it looked on or opposed it. The fact seems to be that what is commonly offered to young men as education is nothing but that drill which makes a clerk. They mistake routine for experience. They despise the most important business of life, which is not merely to repeat the routine of their profession, but to advance it; so it happens that they despise the opportunities which offer themselves, and leave the great successes and even dignities to be seized by others who never had half their advantages. You must not read unless you are working also. The great bulk of all printed matter in England is on political subjects, yet the Prime Minister of England, who has had all his life the best second-hand information, almost always changes his party once in his life, or oftener. He has looked into the matter for himself, and seen things in a new light. This ought to be a warning to us, and induce careful thought on every subject. Mere clerks' business is not our business; we have to consider, and take the lead in directing the arts of construction, and should not be driven out of our course by the theories of people who know nothing about those arts. We listen a great deal too much then. People want to teach us how to point joints, how to play with skyline, how to manage light and shade; but if we are fit to guide in greater matters, in which such persons cannot advise us, we can do without their advice in these things. Our client is the great link between us and our work. He knows what he wants, and what he can afford to pay for it. We have no right to thrust upon him that which he does not want. There are more books and newspapers by a great deal than any man can attempt to read. The greatest improvement that could be made in them would be to introduce engravings in the body of the text habitually. All newspapers will sooner or later have to do this, and we shall get twice the information in one-fourth the time, and all the long descriptions will be cut out. Let us have papers, then, upon matters closely relating to our own business; we can get archæological information and other accessorial information better elsewhere than through the medium of written papers. Let our young men begin to work early. If they cannot get work on their own account, they can take responsible positions under somebody else. Our papers and discussions here ought to help them in that object. And, above all things, do not let us have anybody else coming in to do the work which it is our business to do, but which is too often put aside for merely ornamental studies.

A discussion ensued, in which Mr. Douglass Mathews, Mr. Aldridge, Mr. G. R. Redgrave, Mr. Quilter, and others, took part, and the usual vote of thanks ended the proceedings.

SOCIETY FOR THE ENCOURAGEMENT OF THE FINE ARTS.

ON Thursday week Dr. Westland Marston delivered a lecture to the members of this Society on "The Tragic Element in the Drama and Fiction." The lecturer, premising that his address would be confined to a few hints connected with the present condition of tragic art, declared that at no previous period in the history of literature was there so much distaste for tragedy. Pleasure and deep spiritual emotion at the present day were incompatible terms, the popular taste being in favour of perilous adventures and miraculous escapes. One cause for this was the passion for realism, which seized upon the photographic appearances of life, and neglected its essential parts; another, the monotony of modern society that made it bad taste to feel, and which reduced everything to a dead level of indifference. It was the fashion now to be ashamed of showing spirit. In some degree all art takes notice of externals, but it should not be bounded by them. The lecturer next proceeded to consider the subject of poetic justice, the distribution of which among the characters in a work of fiction he pleasantly likened to an author holding out a sugar-plum to some and a cudgel to others. It was moral teaching that was generally allied with suffering—not poetic justice, which could not be adjusted to this world—that was required. The plays of Victor Hugo conteined pictures of the noblest idealism worked out with a wonderful veracity, and in none more so than in "Marion Delorme." Dr. Marston, in illustration of his subject, read several short passages from Schiller and Shakespeare with admirable effect, and on the conclusion of his lecture was warmly applauded —Dr. Doran (who occupied the chair) drew a comparison between the methods employed by celebrated English and foreign actors in order to raise their feelings to the proper pitch of tragic excitement, insisting that our actors had managed this more naturally than those of France.—Dr. Heinemann thought it incumbent on the dramatist to distribute poetic justice among his personages on condition that it should be in harmony with the laws of the society in which he lived. The vocation of our times was not highly political. Every period had something peculiar to realise, and now political and social ideas occupied the prominent place.—The lecturer having replied the usual vote of thanks terminated the proceedings.

The Surveyor.

NOTES ON THE INCLOSURE ACTS AND THEIR RESULTS.

(*Concluded from page* 411.)

IN the next session 1844, Lord Worsley again brought in a Bill, which was eventually referred to the Select Committee to which I have several times alluded. Their report was not complete until the end of the session. It set forth that a large extent of waste land in the kingdom was capable of profitable cultivation, and that it was in some localities a source of injury and inconvenience to the neighbourhood by its effect upon the character of the population. It referred to the impediment to inclosure caused by the great expense and, in some cases, the uncertainty of procuring private Acts, and also to the fact that the Legislature had repeatedly admitted the principle and advantage of affording facilities for the inclosure of waste lands. It was pointed out that the time was favourable for a general measure—first, because the lands to be dealt with would, by the operation of the Tithe Act, be freed from future liability to tithes; secondly, because of the improved means of draining and manuring such lands at a moderate cost; and, thirdly, because the tithe maps and valuation might be rendered available. It suggested that the Act of 1836 might be altered advantageously, especially with the view of diminishing expense, and remarked on the inconvenience of the occupation of intermixed lands, and the good which would accrue by affording increased facilities for their exchange. After alluding to the inconvenience which had resulted from the imperfect execution of the powers given to Commissioners, the report concluded by stating that it appeared to be practicable and expedient that a general Act, entrusting the control of inclosures to a central Board, should be passed, but that each inclosure ought to be authorised by Parliament.

In the session of 1845, the Government of Sir Robert Peel, acting partly on the recommendations of the report to which I have just referred, carried "The General Inclosure Act," establishing the inclosure Commission for England and Wales. This Act has been supplemented by eight Amendment Acts—passed, respectively, in the years 1846, 1847, 1848, 1849, 1852, 1854, 1857, and 1859. (8 & 9 Vic., cap. 118; 9 and 10 Vic., cap. 70; 10 & 11 Vic., cap. 111; 11 & 12 Vic., cap. 99; 12 & 13 Vic., cap. 83; 15 & 16 Vic., cap. 79; 17 & 18 Vic., cap. 97; 20 & 21 Vic., cap. 31; 22 & 23 Vic., cap. 43.) The original measure authorised the Commissioners to carry out the inclosure of commonable lands, and only required that the further sanction of Parliament should be obtained in the cases of waste or common land subject to rights at all times of the year without limit. The sixth Amendment Act, however, provided that no land should be inclosed without Parliamentary authority.

The process of inclosure, under these Acts, may be thus briefly described. One-third part, in value, of the persons interested sign and forward to the Inclosure Commissioners an application (the form of which is obtained at their office), and provided the lord of the manor also consents, in cases were he is entitled to the soil, an assistant Commissioner is sent down, who inspects the land, inquires into the circumstances and expediency of the proposed inclosure, and holds a meeting for the purpose of hearing any objections. The assistant Commissioner is directed to ascertain, it it be necessary, that any special protection should be provided for public interests or mineral property, and, in the case of common or waste land, whether allotments for exercise and recreation and for the labouring poor shall be set out, in order that special conditions with regard to these matters may be inserted in the provisional order. He then reports to the Commissioners, who, if they approve the inclosure, make a provisional order, in which they state the proportion to be given to the lord of the manor, and set out the special conditions. This order is deposited in the parish, and the assistant Commissioner then holds another meeting to take the assents and dissents; and if he is satisfied that two-third parts of those interested, in value, consent, the Commissioners certify the expediency of th inclosure in their annual general report to the Secretary of State.

A Bill is then brought into Parliament to sanction the various inclosures certified by the Commissioners; and, as this sessional Act is a public Act, it entails no expense on the persons interested.

After the Act is obtained, the Commissioners call a meeting to choose a valuer to carry out the inclosure under their directions, but if a majority of the persons interested both in number and value cannot agree on the choice, the appointment falls to the Commissioners. At this meeting, a similar majority may agree on the instructions to be given to the valuer as to setting out of land for various public purposes, for formation of drains, embankments, &c., the use of plans already in existence, the manner in which the expenses are to be defrayed, &c., &c. The valuer receives the claims, and after they have been deposited for inspection, holds a meeting to hear objections and determines the same, subject to appeal to the Commissioners, and from their decision to the Law Courts. He then prepares the plan, ascertains the value of the several interests involved, makes any necessary roads or stops up useless ones, and eventually sets out the the allotments and draws up a report with a plan attached. This report is examined by the Commistioners and deposited in the parish to be inspected by the persons interested, and after notice, an assistant Commissioner holds a meeting to hear objections which are determined by the Commissioners. The award is then engrossed, signed, and confirmed by the Commissioners, and the inclosure is rendered complete.

Apart from the agricultural question, the Committee of 1844 considered that the existence of commons nurtured a class of idle persons on their borders who were frequently concerned in various illegal acts; they therefore reported that the character of the population would be improved by inclosures. They also thought that the poorer inhabitants would be much benefited by reason of the increased labour which would be required to fence, drain, and cultivate the lands dealt with. In the debate on the Bill, in 1845, however, the opposition was principally on the ground that the small occupiers and poor people would suffer.

There is no doubt that the process of inclosure sometimes deprives this class of persons of some advantages, and it is difficult to compensate them by the small allotments to which they become entitled; the Acts, however, particularly direct that small proprietors shall be specially considered, and the provision rendering it impossible to inclose village greens, as also the allotments for the labouring poor and for recreation, testify to the consideration which has been given to the subject by Parliament. When a special Act was passed, a poor man had no chance of protecting his interests, because of the expense which such a proceeding involved; under the present system, however, he has the opportunity of appealing to the assistant Commissioner on the spot.

The Acts provide for the completion and confirmation of incomplete inclosures under former Acts, and also empower the Commissioners to carry out exchanges quite independently of inclosures. This latter process, which avoids the necessity of any investigation of title, is very inexpensive, and has been most extensively adopted; and, in the twenty-fifth annual report of the Commissioners, published this year, it will be observed that no fewer than 3676 such exchanges have been confirmed.

The labours of the Inclosure Commissioners have been attended with great success, and in their report which has just been referred to, it appears that 843 inclosures, dealing with 531,000 acres, have already been confirmed, whilst 149 are in progress for the purpose of inclosing 120,000 acres. They also state that the expenses incurred by their office, and repaid by the parties interested, up to the time of the introduction of the annual bill, have only averaged £15 19s. 6d. in each case.

The subsequent expenses vary, but they are very much less than formerly, if the cost of new roads is moderate. In instances in which I have acted as valuer, the costs have been as follows:—

Two Common Field Inclosures—Quantity . . .	667 acres
Cost of roads, about . .	18s. per acre.
Other expenses	15s. do.
Six Waste Land Inclosures —Quantity	2523 acres
Cost of roads	33s. per acre.
Other expenses	30s. do.

In the latter series, I have omitted some heavy legal costs in the case of one small inclosure, which though defrayed out of the funds raised, were quite exceptional.

The general cost of the inclosure of waste lands, as shown by these figures, is somewhat high; but the fact that some of the commons were extremely small must be taken into account In each of these cases less than fifty acres were dealt with.

I may perhaps here refer to the subject of the width of turnpike roads, which is dependent on the General Turnpike Act, 3 George IV., cap. 126. This statute provides that across waste land no fence or building shall be placed within 25ft. of the centre of the road, or if within three miles of a market town, within 30ft. Thus, a road 50ft. wide must be set out even in agricultural districts, not only involving a great waste of land, but a considerable inconvenience and nuisance, and practically leaving a large tract of waste still uninclosed. The trustees very frequently consent to a lesser width, but they are not obliged to do so, and if they refuse, the Turnpike Act must be complied with.

From the sketch of the legislation on this important subject up to this point, it will be seen that Parliament has fully recognised the great advantage of inclosing wastes and unprofitable land, and removing any rights that interfere with its free cultivation. From time to time, however, provisions have been inserted in the various Acts, in order to preserve open spaces for the public, and for large populations. Village greens cannot be inclosed, and recreation grounds and allotments for the poor may be set out if necessary, in the cases of inclosures of waste land. Any proposals for dealing with commons near London, or other large towns, have been regarded by parliament with great jealousy, and in the year 1865, a Committee of the House of Commons reported on the best method of preserving to the public open spaces in and around the metropolis.

Their attention was directed to the question of the inclosure of portions of commons by "approvement." This process is authorised by an old Act of Parliament, passed in the reign of Henry the Third, 20 Henry III., cap. 4, and known as the statute of Merton. It was intended to enable the lords of manors to inclose (probably for the purpose of improvement or cultivation) such portions of the waste as were in excess of the requirements of the commoners. The Committee recommended, amongst other things, that this statute should be repealed, at all events so far as Surburban Commons were concerned.

In the following session, 1866, an Act was passed for the purpose of preventing the inclosure of commons, under the Inclosure Acts, within the Metropolitan Police District, 29 & 30 Vic., cap. 122. This measure also provides a machinery, to enable persons interested in such commons to apply to the Commissioners to prepare schemes for their management, which, after the observance of certain forms, are to be submitted for parliamentary sanction. By the Commissioners' report this year, it appears that applications have been made to them in eight cases, but no scheme has yet been completed.

In the present session, a Bill has been introduced to extend the provisions of the Act of 1866 to commons within certain distances of towns containing 5000 inhabitants and upwards.

Last year, a Committee reported on the subject of the Public Recreation Grounds and Allotment Gardens, set out under the Inclosure Acts, and suggested some alterations in those Acts, with a view to enlarging the powers of the Commissioners. This session, the government has introduced a Bill, proposing that as much as one-tenth part of the whole value of any waste land shall be appropriated for those purposes; and giving the Commissioners power to reserve a recreation allotment in the cases of common field inclosures if the public have been in the habit of using any portion of the land to be dealt with for such a purpose. Common fields have hitherto been exempt from this condition. Rides and drives for the public may also be set out, and the assent of the local authority is required before any land can be inclosed within certain specified distances of towns containing 2500 inhabitants and upwards.

Provision is also made for posting the notices of meetings in a greater number of places, and for distributing them as handbills in order to give them greater publicity. It is further proposed that the valuer shall send all the claims and objections to the Inclosure Commissioners, who will fix the meeting for hearing and determining the same, and direct the attendance of an Assistant Commissioner, as assessor, if they think fit.

The beneficial effects which have resulted from

nclosures can hardly be estimated too highly. In the cases of common fields the removal of the complicated rights and customs, which so much interfered with their profitable cultivation, has increased their value in a very great degree; it has also enabled the owners to effect operations of improvement, such as drainage; and the new roads which have been constructed have not only benefited the land dealt with, but afforded improved communication for the public and the neighbourhood.

I have frequently had occasion to make valuations in parishes inclosed by my father thirty or forty years previously, and have found the value four or five times as great as it was at the time of the inclosure. But land is not only improved from an agricultural point of view; it is frequently converted into building sites; and some inclosures of common fields which I carried out in the neighbourhood of Cheltenham may be referred to as instances in which, probably, the value has been increased tenfold. I remember a small common field, property which was looked upon as of so little value that it was left quite uncultivated, and hardly possessed an owner; the process of inclosure soon changed its character, and since that time it has been built over.

The inclosures of waste lands have also exhibited very interesting results. At Framfield, Sussex, the quantity dealt with was 2000 acres, and the lands in respect of which rights of common were exercised extended into seven parishes, and comprised some 12,000 acres. It was very generally thought in the neighbourhood, that the value of the whole of the waste would hardly suffice to pay the expenses. The results were however satisfactory, for the portions sold to defray the expenses did not exceed one-eighth of the whole. Some of the land was comparatively worthless, but the prices obtained averaged about £20 an acre, which was but little less than the price at which inclosed land had been selling.

I will not, however, weary you with instances of the improvements which are so generally familiar to us. Many members of this Institution can no doubt call to mind many interesting cases. It is satisfactory that in no single case within my own experience has the cost been so great as to render the inclosure unprofitable.

In reviewing this brief sketch, it appears that the working of the Inclosure Acts, under the superintendence of the Inclosure Commissioners, has very successfully carried out the intentions of the Legislature. The cost of inclosures has probably been reduced by as much as 50 per cent., and at the same time the process has been accelerated and rendered uniform and certain. The interests of the public, as well as those of the poor inhabitants, have received their share of attention, and the present legislation is apparently tending towards the encouragement of the inclosure of rural commons, whilst it seeks to preserve open spaces for the recreation of large populations.

A discussion followed in which several members took part, and the proceedings terminated with a vote of thanks to Mr. Hall for his paper.

ON A NEW METHOD OF STRAIGHTENING HIGH CHIMNEYS*.

IT is a well-known fact that high chimneys, however carefully built, often lose their original straightness soon after their erection, and assume an inclined position or a curved shape. This frequently takes place to such an extent that the stability of the chimney is endangered so that it becomes necessary to straighten it. This is generally done by making an incision, or several, in the chimney on the side opposite to that to which the chimney is inclined. This operation is performed by means of large saws. Recently, however, a very high chimney erected by Messrs. Wesenfield & Co. in their chemical establishment at Barmen (Prussia) was straightened successfully by a different method.

This chimney is 331ft. high. Its exterior shape is octagonal, with a clearance of 8ft. throughout its whole length. This gives it an interior sectional area of 33 sq. ft. The socle is quadratic in section, 20ft. wide and 40ft. high. The upper or pyramidal part of the chimney is octagonal, 291ft. high. The exterior diameter of the latter is 17ft. at the base of the pyramidal part. This diameter is reduced 2½in. on every 10ft. upwards. The masonry is 7 bricks thick in the basement, 5 at the base of the pyramidal part, and 2 at the top.

* Condensed and adapted from "Zeitschrift fur Bauwesen."

For the sake of comparison we here add the following table :—

TABLE CONTAINING THE MOST IMPORTANT DIMENSIONS OF SOME REMARKABLE CHIMNEYS (br. = length of brick.)

Number.	Height including foundations. h	Height excluding foundations.	Exterior diameter below. g	Exterior diameter above.	Thickness of masonry below.	Thickness of masonry above.	Decrease of diameter on every 10 feet of height.	Relation of the height to the diameter of base. h / g	Locality.
	ft.	ft.	ft.	ft.			Inches.		
1	—	441	31	12 3-8	5 1ft.	1 1-2 br.	5·09	14·19	Port Dundas, near Glasgow (Scotland).
2	434	440	39 1-3	13 1-8	3 1-2 br	1 1-2 br.	7·49	10·67	St. Rollox, near Glasgow (Scotland).
3	345	331	18	11 1-6	5 ft.	1 1-2 ft.	2·47	18·39	Chemical factory at Barmen (Prussia).
4	347	330	29	11 1-2	6 1-2 ft.	1 1-2 ft.	6·36	11·38	Cast Steel Works at Bochum (Prussia).
5	—	274	18 1-2	10 3-4	4 ft.	1 1-4 ft.	3·4	14·82	Dye Works, Hagen (Prussia).
6	225	221	17 5-6	7 5-8	3 1-2 br.	7 in.	5·53	12·42	Pontasser's Chemical Works (England).
7	—	175	20 3-4	7 1-2	4 5-6 br.	8 3-4 in.	9·07	8·44	Alois Iron Works (France).
8	173	155	17	6 3-4	3 br.	1 br.	7·91	9·14	Hepburn's Tannery on the Tyne (England).
9	167	161	13 1-2	5 1-3	3 3-4 ft.	10 in.	6·08	11·93	Dye Works, Barmen (Prussia).
10	162	150	16 2-3	6 2-3	4 1-2 br.	10 in.	8·0	9·0	"Einer Graben" Chemical Works, Barmen (Prussia).
11	144	132	11 1-2	5	3 1-2 ft.	10 in.	5·90	11·50	Eisengarn Factory, Barmen (Prussia).
12	133	126	9 1-8	4 1-3	2 1-2 ft.	10 in.	4·54	13·86	Dye Works Oehde, near Barmen (Prussia).
13	—	128	10 1-3	4 1-2	3 1-2 ft.	1 br.	5·45	12·43	St. Ouen, near Paris (France).
14	131	126	15 1-2	6 3-4	4 br.	1 br.	8·31	8·14	White's Factory (England).
15	136	124	11 1-2	6 1-2	3 ft.	10 in.	4·82	10·81	Rolling Mill, Hagen (Prussia).

In looking over the table it might appear strange that the proportions of the height to the diameter of the base has been taken so very high in the construction of the chimney No. 3, which is the subject of the present paper. For, by comparing this proportion to those used in the construction of any of the other chimneys mentioned, it becomes evident that this high proportion has been chosen against all previous experience and practice. The explanation of this is found in the circumstance that the chimney was to have, according to the original design, a height of 260ft. only, which by a latter resolution was changed to 331ft. As the construction had then been commenced, and was proceeding in a very satisfactory manner, it was considered best and sufficiently safe to increase the height without altering the dimensions of the base. The consequence, of course, was that every square foot of a section through the masonry of the lower part of the chimney was subjected to a very high, and indeed, abnormal pressure.

An exact calculation has shown that one square foot of masonry in the lowest part of the chimney proper carries a weight of 21,335lbs., or 149lbs. per square inch.

For comparison the highest pressure existing in the chimney No. 4 (see table) erected at the Bochum cast steel works, was calculated and found to be 18,429lbs. per square foot, or 128lbs. per square inch. The difference amounts to 21lbs. per square inch, or little below 1½ atmospheres, which constitutes the excess of pressure in the masonry of the chimney at Barmen over that of the Bochum chimney.

The chimney at Barmen (the straightening of which we propose to describe hereafter) was built with the greatest possible care. A good underground was available, consisting of a stratum of hard and coarse gravel. The foundation and the socle were built in the summer of 1867. The foundation was made of large, flat quarry stones with terrace mortar (1 lime, 1 river sand, 1 terrace, which is a kind of puzzolana). The socle was made of brick with ordinary mortar (1 lime on 2 river-sand).

The mortar was prepared every morning by the masons themselves. Cement mortar (1 cement on 2 river-sand) was used on rainy days. The crown of the chimney was built with cement exclusively. The joints of the masonry were flushed up with cement, and gradually as construction proceeded.

The three masons who did the whole work daily changed their positions on the chimney so as to equalise any unevenness in the masonry that might be caused by imperceptible differences in the manipulations of the different individuals. At distances of fifty feet single layers of brick work were painted black outside to afterward facilitate an estimate of the height of any point of the chimney above ground. The chimney was built from the inside without a scaffold, the materials being hoisted by a steam engine put up temporarily near the place of construction. The motion was transmitted by three rollers or drums. The frame which supported the upper drum was moved higher up after the completion of every three or four layers of brick, and was at the same time turned horizontally from one side of the octagon to the next one to equalise the effect of the pressure of the frame on the masonry. The holes made into the masonry to support the frame were filled up with brick and mortar immediately after the removal of the frame to a higher level.

The construction of this chimney was thus successfully completed in October, 1867, and answered perfectly the requirements for which it was erected. It was perfectly vertical and straight.

However, in the spring of 1868, remarkable for vehement and long-continued gales and storms, this chimney suddenly assumed an inclined position toward the north-east. The injurious action of the south-west wind was probably favoured by the bold proportions of the structure, by the yet subsisting softness of the mortar, and by the large size and the shape of the richly ornamented chimney crown. This crown caught the wind, and thereby caused it to act as on a long lever. The chimney was thus bent, and the mortar not perfectly dry, the brickwork did not yet possess the necessary elasticity to return to its original shape.

The deflection of the chimney was considerable at the end of May, and seemed yet to increase, and threatened an overthrow.

As above mentioned, some layers of bricks in the chimney at distances of fifty feet from each other were painted black outside. The height of these black lines above the socle being known, these lines were, by means of a theodolite, projected on a plank situated on the socle of the chimney, to find the deviation from the vertical line at these different heights. It was thus ascertained that the chimney at a height of

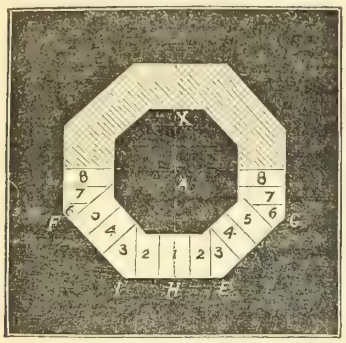
251 feet	was out of line	.....	45 inches.
210 feet	„	.....	30 „
160 feet	„	.....	16 „
110 feet	„	.....	5 „

The socle stood perpendicular. As the deviation was still increasing, and as it would have done too serious an injury to the manufacture of the establishment to set the chimney temporarily out of use, it was necessary that immediate action should be taken in the matter. The ordinary method of straightening chimneys was at first resorted to. A hole was made through the whole thickness of the masonry on that side of the chimney which required lowering four feet above the top of the socle. Into this hole a saw was introduced with which a horizontal cut through one half of the chimney was attempted. But as the thickness of the wall was considerable and the bricks hard, and as the saw could be manipulated from one of its extremities only, the effect of sawing, after two hours' work, was scarcely perceptible.

The hole through the chimney having been made without trouble, and the difficulty experienced in sawing led to the idea to gradually remove a whole layer of bricks, replacing it by a thinner layer thus to produce the desired slit. Before, however, this operation was performed, the experiment was made with an old inclined chimney 120 feet high. When the method had there proved practicable and successful, it was

concluded to treat the new chimney in the same way.

A layer of bricks was broken out by means of pointed cast-steel bars, from 1½ to 5 ft. in length. The annexed figure shows a horizontal section of



this layer, the inscribed numbers, 1, 2, 3, 4, etc., indicating the succession in which the different parts or divisions of the layer have gradually been removed. When the division 1 was broken out, it was replaced by thinner bricks covered with terrace mortar. After this the two divisions, marked 2, were broken out and replaced by thinner bricks, then the two divisions, marked 3, and so on until one half of the whole layer was thus exchanged.

Flat shovels with long handles were used to lay those bricks which had to be placed near the inside of the chimney. A space of 5 inches was left each time between the newly-laid bricks and the old ones of the next division, to break out the latter with greater facility.

The width of each single division was 2 ft. to 2½ ft. The masonry was sufficiently dry above not to give way when a layer of that width was removed below it. The replacing bricks were taken thicker gradually as the operation drew nearer the points, A and C (see engraving), so as to get the slit wide in the middle and gradually extenuating towards it two extremities at A and C. As soon as the slit reached these points, the chimney began to move, and by slight oscillations slowly settled down on the new layer of bricks, and when it had reached it, remained quiet.

The act of settling by oscillations lasted from 18 to 36 hours, corresponding to the width of the slit which was different in the different cuts performed in a similar way at different heights of the same chimney. The oscillations were the greater and the livelier the higher up the cut was, which produced them.

At the highest cut, 100 feet from the top, the oscillations were such that the masons became frightened and left the place, the slit became alternately wider and narrower by ¾ of an inch. The facts before mentioned seem to prove the elasticity of the whole structure. Four cuts were made into this chimney; the

1st.	4 feet	above the socle,	greatest	width	⅝
2d.	100 feet	,,	,,	,,	1¼
3d.	140 feet	,,	,,	,,	1½
4th.	191 feet	,,	,,	,,	1¾

After the completion of these operations the chimney continued during several weeks to settle slightly in the direction opposite to its former inclination, the brickwork on that side being now subjected to a higher pressure than before.

This circumstance has to be carefully considered beforehand, or else the slits would be made too wide and produce an inclination of the chimney in the opposite direction. A severe storm which occurred on the 6th and 7th of December, 1868, and which threw over several chimneys in the neighbourhood, did not affect the above. The result of the straightening operation before described is perfectly satisfactory, and the structure is now stronger and steadier than ever.

We have yet to speak of the means by which the upper parts of the chimney were made accessible to perform the upper cuts. This was done on a new and interesting plan. Standing on the lowest platform, the masons made a number of holes all on the same level, 4 feet above the platform, into the exterior wall of the chimney. They stuck iron bars into these holes and fixed boards to them so as to form another platform. Standing then on the latter, they made another one four feet higher up in the same way, and so forth. Every second platform was again removed, so that the remaining platforms were 8 feet apart. They were then joined by ladders, to make the ascent possible and easy. This method is, however, only practicable when the chimney has a considerable diameter, and when the mortar is sufficiently dry not to give way under the one-side pressure of the bars and platforms, which would make the arrangement loose and unsafe.

In December, 1868, another chimney at Duisburg was straightened by the method above described. But as the diameter of the chimney was not as large as that of the Barmen chimney, and as the mortar was yet soft, a wooden scaffold was erected around the chimney to get at the upper points which required cutting. The breaking out and replacing of the bricks could not be done there in divisions wider than 5 to 10 inches, otherwise the upper masonry not being dry, would have settled down. When the chimney was straight, a further settling towards the side of the cut was prevented by driving iron wedges covered with mortar into the slit.

We shall finally not omit to remark that it is advisable to straighten a chimney as soon as there is a decided evidence of its deviation from the vertical position. For while the mortar is not hardened, the deviation gets worse and worse, and the operation more difficult and more expensive.

PRESBYTERIAN CHURCH, CAMBERWELL.

THIS church (which we illustrate), is situate at the corner of Brunswick-square, Camberwell, and is now being erected under the superintendence of Mr. S. C. Capes, architect, at a cost of about £5200. It will accommodate 600, without galleries, and 200 in galleries—to be added as required at the west end and in transept. The length of nave is 85ft., the width 26ft., and, including north and south aisles 50ft; height of nave to ridge of roof 56ft.; the roof is to have open timbers and will be covered with slate; the walls will be of Kentish rag, with Bath stone dressings. Mr. Wells, of Russell-street, Bermondsey, is the contractor. The building is to be completed by Michaelmas next.

ARCHITECTURAL AND ARCHÆOLOGICAL SOCIETIES.

OXFORD ARCHITECTURAL AND HISTORICAL SOCIETY.—The members of this society and their friends visited Rycote and Thame on Saturday week. The remains of the mansion at Rycote were first examined. They are but a small portion of the original mansion, which was almost a palace. Indeed, it was the residence for a time of two crowned heads. The principal portion of the mansion was erected by Lord Williams of Thame, but there was a house of an earlier period, and the present remains probably belong to that. The details point to the period when the estate was held by Sir Richard Quartremain, who was a Knight of the Shire in the Parliament of the 12th of Henry VI. (1434). The Church was probably erected at the end of the 15th or beginning of the 16th century. In plan it is a simple parallelogram, with a western tower. It is covered with a wagon-headed roof, boarded on the curved ribs, and painted in colours. There is a staircase which was intended to lead to a rood, but it is doubtful if the loft was ever erected. The seating is of Elizabethan character, and is doubtless original. The buttresses are carried above the eaves, and are surmounted with pinnacles, the two easternmost ones having quaint figures of animals instead of pinnacles, resembling those in the quadrangle of Magdalen College. An account of the leading features of the Church was read by Mr. Bruton. The members then continued their journey to Thame, when the chief points of interest in the Church were described and pointed out by Mr. Payne, of Charsley's Hall. It is a handsome cruciform structure, and was probably erected in the middle of the 13th century. It has undergone the usual changes, and had windows inserted in the 14th and 15th centuries, and it has not wholly escaped the more recent and less judicious alterations of more modern periods. The exterior is covered with rough cast, and this covering, it is said, was put on at an unusually early period, viz., that of 1529. There are some tombs and fine brasses of the Quartremain family, of Rycote, in this Church. The Prebendal House, erected about 1241, was next visited. There is only a ruined chapel, now used as a dormitory for stable boys, remaining of that period, but more of the 15th century erections remain, though, as there is a modern house in the grounds with some architectural character, much was probably pulled down to provide materials for it. The Grammar School of Thame was also visited. This was founded and endowed by the Lord Williams of Thame above mentioned, though it was not till 1575 that the foundation was completed.

THE MIDLAND INSTITUTE.—The first excursion of the members of the archæological section of this Institute will be to the city of Hereford, and has been fixed for Tuesday next. On arriving at Hereford, the members of the section will first visit the cathedral, where, under competent guidance, their attention will be called to the most remarkable portions of its exterior, the chief features of which are the picturesque porch, the lofty Early Geometrical windows of the north transept, the profusely-enriched central tower, and the two remaining sides of the cloisters. The interior of the building will then be visited, when the massive and beautiful Norman nave will be the first object to arrest the attention of the visitors. After studying the details of the architecture of this portion of the cathedral, they will be asked to notice Bishop Booth's monument, with its original screen of wrought iron; the old pulpit of Jacobean work; the curious Norman font; the altar-tomb of Sir Richard Pembridge; the handsome eagle lectern, and the magnificent screen and corona of wrought iron-work, made by Messrs. Skidmore, of Coventry. The choir, with its Norman arches and triforium, and Early English clerestory and vaulting, the choir stalls and reredos, and the curious and elaborate monumental effigies, statues, shrines, and canopied tombs will then be examined. The examination of the cathedral will be brought to a close by a visit to the library and archive room, the treasures of which will be shown by the Rev. Francis T. Havergal, who has also promised to exhibit and describe the famous Mappa Mundi, which will in itself be by no means the least interesting of the many objects which will claim the attention of the visitors. On leaving the cathedral the members of the section will, by the kind permission of the bishop, be allowed to visit the Bishop's Palace and grounds. In the palace there is a curious old timber roof, supported on Norman arches, in wood, which deserves careful notice. After a stroll through the grounds, it is proposed, at three o'clock, to adjourn to dinner, which will be provided at the Green Dragon Hotel for the members of the Institute present. After the dinner excursions will be made into the city. The excursionists will leave Birmingham, by Midland Railway, at 9 a.m., and will return from Hereford at 7 p.m.

THE LEICESTERSHIRE ARCHITECTURAL AND ARCHÆOLOGICAL SOCIETY.—A meeting of this Society was held in the Town Library, Guildhall, Leicester, on Monday week, the Rev. J. H. Hill in the chair. The following gentlemen were elected members:—The Rev. the Confrater of Wiggeston's Hospital (the Rev. T. Henry Jones, M.A.), Joseph Arnall, Esq., Leicester; W. Maxfield, Esq., Leicester; Captain Pearson, South Kilworth; Montague South, Esq., Leicester.—The Chairman and Mr. Bellairs each exhibited coins.—Mr. Hunt exhibited drawings of ancient incised stones found built up in the Norman portion of the walls of Thurnby church, in this county. These stones will be sent for exhibition to the Museum of the Royal Archæological Institute, in Leicester, in July next.

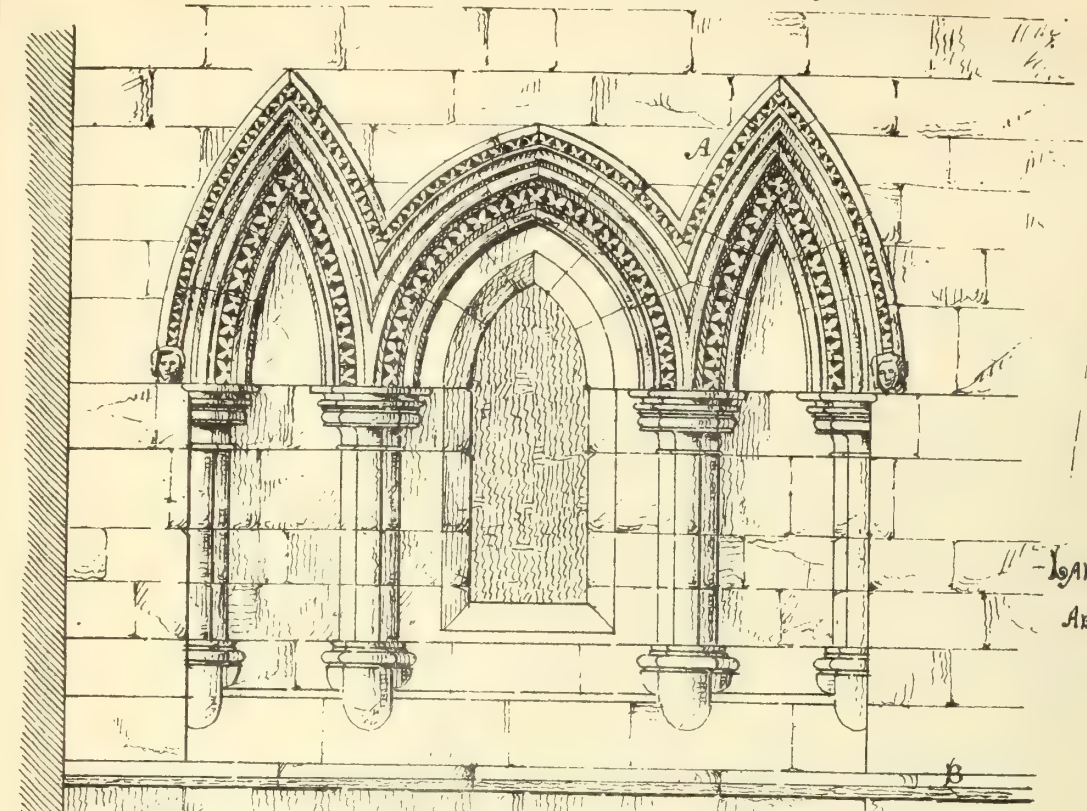
The Kent Archæological Society will hold their Congress this year at Sittingbourne. At Maidstone, the remains of the Roman villa at the end of Stone-street are being excavated by the society.

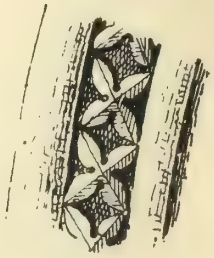
This year's Congress of the Archæological Institute will be held at Lincoln, at the end of July, under the presidency of Lord Talbot de Malahide.

The British Archæological Association will hold its annual Congress at Hereford during the first week in September, Mr. Wren Hoskyns presiding.

LITERARY MEMORIALS. — London builders, says the *Athenæum*, show little respect for historical or literary memorials; nor can we reasonably complain of their indifference. A few years ago, Steele's cottage on Haverstock-hill was swept away, and a prim row of houses occupies its site. Within the past month, we observe that the old-fashioned red-brick house on Green-hill, Hampstead, once occupied by Thomas Norton Longman, has vanished. Many a literary party there assembled, and from the hospitable board strolled to enjoy the vast metropolitan prospect from the elevated and spacious garden.

: BOLTON · ABBEY : YORKSHIRE :

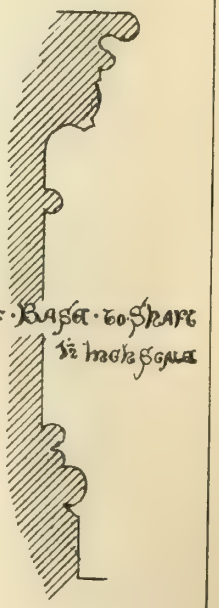




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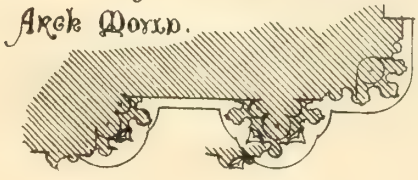


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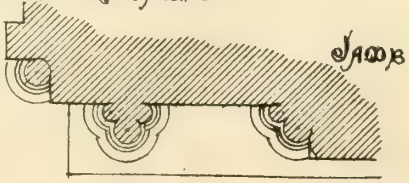
Cap & Base to Shaft
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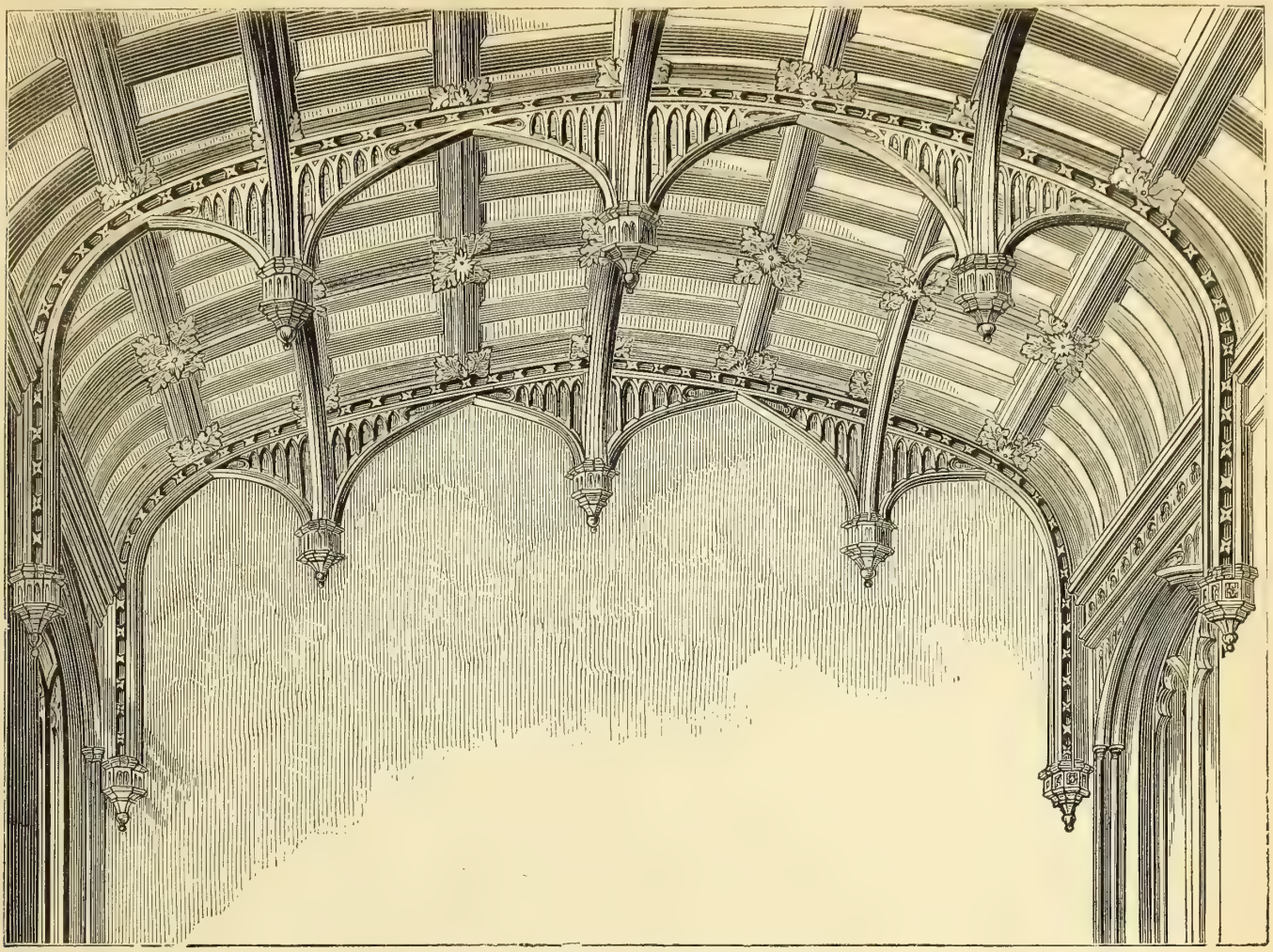
Measured and Drawn By
W. H. Littlewood 1869

Lith. of Bemrose & Sons, Derby & London.



Photo-Lithographed by Whiteman & Bass London.

Presbyterian Church, Camberwell.



ROOF OF CROSBY HALL, BISHOPSGATE.

BRIEF CHAPTERS ON BRITISH CARPENTRY.

By Thomas Morris.

(*Continued from page* 419).

IN the fifteenth century London's fashion, equally with commerce, had its centre in the City. There, too, the religious orders were most numerously represented; and at Bishopsgate, whose dense population is now so active in secular pursuits, dwelt the pale Sisterhood of S. Helen's Priory. Among the hereditaments of that establishment was a great tenement held by Cataneo Pinelli, a Genoese merchant. In 1466, Dame Alicia Ashfelde, prioress, granted a lease of that tenement for ninety-nine years to John Crosby, already, it may be presumed, a wealthy citizen. It is noticeable, indeed, that although the times were perturbed by two antagonistic kings who, like rival suns, were alternately in lustre and eclipse, commerce was steadily pursued, and social conditions were improved. The priores of S. Helen's had in her new tenant a type of the civic magnate of the period. Assiduous in civic affairs, he served the offices of alderman, sheriff, warden of the Grocers' Company, and mayor of the staple of Calais. He was a pronounced politician of the Yorkist party, and member of Parliament for the City in 1461, when Edward IV. was proclaimed. He attracted Edward's favour, and, in 1471, received from him the honour of knighthood. Henry VI. died that year in the Tower, where much of his life had been spent, partly as a sovereign prince and partly as a prisoner of war. It was, however, the tenth regnal year of his successor.

Soon after obtaining his lease from the Priory, Crosby demolished the former residence, and built a very perfect mansion with state and ordinary apartments, chapel, domestic offices, stables, bowling-green, grass-plots, pleasance, and garden. The remains were investigated some years ago by Mr. John Woody Papworth, to whose drawings the medal of the R.I.B.A. was awarded, and his plan was published among the illustrations of Mr. H. J. Hammon's work, produced in 1844. Much of the plan thus made public consists of restorations to suit the actual remains; but the hall and some adjacent rooms have never been entirely lost, though for a long period subject to most lamentable neglect and dilapidation. As Sir John died in 1475, the date of his erection is determined with more than usual precision; and the after-history of the place, embracing its associations with Sir Thomas More, Shakespearian Richard (the poet himself is supposed to have lived near), with monastic surrenders to the Crown, and a long line of notables, has sustained the interest so admirable an edifice was calculated to originate, and of which two centuries of degradation did not preclude the revival in the present age.

The architecture of Crosby Hall has some remarkable analogies to the buildings described in our two last chapters. The dimensions within the walls are about 56ft. by 26ft.; but it is in size, rather than any other quality, inferior to its contemporary at Eltham. These buildings are by no means of identical design, yet there are such striking points of resemblance in style and detail as to induce a supposition that they were produced by the same architect. The two-light windows have heads of very similar curvature, and the label mouldings are continued horizontally across the piers; but instead of two windows to a severy, as at Eltham, there is here but one. The windows are only 7ft. from centre to centre, and their inner jambs are shafted and ornamented with arch mouldings, so that the plain wall pier is merely wide enough to admit the stone corbels (of octagonal plan, with hollow sides, panelled and battlemented), from which spring the ribs of the roof. The length of the hall is divided into eight severies, with nine chief ribs, since the general rule was followed, by which the timber work is kept free from dependence on the end walls, and the latter simply perform the office of enclosures. The manner in which the side walls are terminated internally is exceedingly ornamental and perfect. The bold stone corbels before spoken of finish at the springing of the window arches. The surface from springing to crown has spandrels with narrow trefoil-headed panels. Above the spandrels a fine band of quatrefoils in squares, with central bosses between the cusps, extends the whole length, and is surmounted by an effective capping, whose upper member is notched into battlements. Below the sills of the windows there is no string-course, but the plain face of the wall was no doubt intended for the display of tapestry hangings or other graphic decorations. A fine octagonal bay window on the west side, and more centrally placed than usual, is the whole height of the wall, the lights being in three stages with battlemented transoms, and the head finished with delicately-mounted rib groining.

I dwell minutely on the features of this hall, and its intrinsic merit would amply justify particular description; but there is a peculiarity not commonly recognised—the thoroughly masonic design that pervades alike the stone and wood, though each material is distinctively and appropriately treated.

Comparison may now be removed to King's College Chapel, which illustrates an attempt by the mason to throw a ceiling of stone over the entire internal area by a method varying in some respects from the groining of older date, the leading distinction in form being the four-centred or pointed elliptic arch of the great cross ribs that perform the same office as timber principals in carpentry. Stone ribs

usually spring from vaulting-shafts that rise specially from the base of the wall; but for those of timber the usual support is a corbel or bracket. In such a parallel it will be admissible to allude to the roof or ceiling of the Divinity School at Oxford—a work of the same age, and displaying in eccentric combination main cross-ribs with perforated backing, fan-groining, pendants and panelled tracery. The design of the Crosby Hall roof appears to be made up of the arched ceiling of the Cambridge Chapel and the longitudinal lines of arches and pendants met with at the Oxford school. Without so close a resemblance as could be termed in any degree servile, there is just such a relationship as may indicate the inductive path of artistic invention at the period.

Mr. Hammon gives a very clear and graceful view of this ceiling or inner roof. (The nature of the timber work above it has been already shown.) There is no attempt at groining, but the waggon vault with its chief and secondary ribs, its longitudinal purlins, traceried arches, carved pendants, and mitre bosses—even the mouldings and flowered hollows—make the notion irrepressible that the designer was not unused to ornamental stonework. The planks that seem to occupy the place of rafters follow the curve of the cross-ribs and have hollows on the edges, and the space between them is filled by thinner boards, so that an uniformly broken surface of suitable character and richness is produced. In addition to the Great Hall, there are other apartments whose ornamentation is of much elegance. In the days of its early perfection the grace and finish of Crosby Hall must have shed dignity upon the assemblages for stately council or festive entertainment it no doubt frequently contained. Looking also to the ascribed direction of its origin, there may be perceived something more than happy chance—a character of restitution—in the adoption by the late Mr. Wilkins of this work as a model for the new hall of King's College, Cambridge, where, under the shadow of that noble masonry to which its conception is so clearly traceable, and where, apparently more indigenous than in its metropolitan nativity, this admirable design has entered a revivified and appropriate career.

THE PARISIAN BUILDING TRADES.

IT has been said that the contemplation of the misfortunes of even our best friends is not altogether unattended with pleasure. London builders who complain of the present dull times may therefore find some consolation in the far worse condition of their Parisian brethren. The dismissal of Baron Haussmann has caused the stoppage of the vast and expensive works which he had but half completed for the improvement of Paris. Not only this, but the builders cannot get the city authorities to pay them for work already performed. Left with hundreds of unemployed workmen on their hands, and yet with the tantalising spectacle before them of unfinished buildings falling into ruin, their position is far from pleasant. That of the men, however, is still worse. High wages have for the past twelve years attracted to Paris a vast army of workmen who are now in distress. A petition has been presented by the master builders to the Corps Legislatif, but we fail to see how that body can help them. To resume building operations, even were the city of Paris, by means of fresh loans, able to pay for them, would only postpone a recurrence of the difficulty. Meanwhile, bankruptcy stares the masters in the face, and starvation threatens the workmen. If something is not speedily done, the Government will find itself in the presence of a more formidable danger than even the opposition of the Irreconcilables. The first revolution commenced with a cry for bread, and, as the *Daily News* observes, a state of things has now been created not unlike that which existed in 1848.

The death is announced of Mr. George Alexander, of Yarmouth, a painter in water-colours of some repute.

Furniture & Decoration.

ON THE USE AND ABUSE OF ORNAMENT AND COLOUR IN ITS APPLICATION TO HOUSE DECORATION.

THERE are certain principles which should govern the application of painted ornament to the decoration of our dwelling-houses and public buildings which are either not properly understood or are in many cases lost sight of altogether. These principles may be called fitness, adaptation of form and colour to position and circumstances, harmony, correctness of drawing, and execution. No work can be successful without these qualifications.

Mr. John Ruskin makes some observations on modern room decorations which we cannot allow to pass without question. He says (*vide* "The Two Paths," Lect. 3) "You will every day hear it absurdly said that room decoration should be by flat patterns, by dead colours, by conventional ornament, and I know not what. Nobody ever yet used conventional art to decorate with who could do better. A great painter will always give you the natural art, safe or not. Correggio gets a commission to paint a room of a palace at Parma. Any of our people bred on our fine modern principles would have covered it with diaper; not so Correggio. He paints a thick trellis-work of vine-leaves with oval openings, and lovely children leaping through them into the room." Fancy our decorators decorating our English homes in this fashion! Could anything be more absurd? Vine-leaves and trellis-work, with even the loveliest of lovely children continually suspended in mid-air, may be in good taste at Parma, but terribly out of place in English dwellings. We prefer to see our lovely English cherubs jumping about the room, instead of through its walls. In these matters we are but too apt to forget that the style of decoration suitable to the sunny climes of the South and East, and most in harmony with the habits and customs of its peoples, are in a great measure, if not altogether, unsuited to our insular situation and domestic habits. We may adapt them (or rather what what is good in them) to our purpose, and we may derive many valuable lessons in form and colour from them; but to transplant them in their original form is a grave error. The black dado, red pilasters, and frieze with yellow, blue, or white panels above, as seen in a Pompeian house, would look *outré*—out of place and tawdry—utterly foreign to our habits and to the style of our architecture. Again, we have the Moresque or Moorish style of decoration—a combination of some of the best features of the Egyptian, the Greek, the Roman, the Byzantine, and Arab styles, admirably adapted to the land of cloudless skies, where shade and coolness were a necessity, and only to be got by a particular style of architecture, with open courts for light and ventilation; but in our "muggy" climate, where we have but too little sun and plenty of wind, such a style of decoration is, to say the least of it, unsuitable. Many of its beautiful geometrical diapers and ornaments we may use with advantage, and the lessons in colour which it teaches cannot be over-estimated. But to make our rooms exact counterparts of the beautiful halls of the Alhambra (even if we could) would be simply ridiculous. We are aware that some of our principal decorators have got somewhat of a Pompeian fever, and have been painting black drawing-rooms, &c., *à la* Pompeii. Notwithstanding such authority, we must consider them as

Mistaken souls who dreamt of heaven.

As to Mr. Ruskin's assertion that nobody ever used conventional ornament if he could do better, we consider the assertion, to say the least of it, to be unwarranted by facts, and without meaning. If Mr. Ruskin means that no artist would use flat ornament if he could paint vine-leaves and trellis-work, there is no truth in the assertion; as there are many artists who can paint better things than vine-leaves and trellis-work who both design and paint conventional ornament. If he means that an artist who can paint vine-leaves, &c., would paint them as room decorations as being more appropriate than flat ornament for that purpose, then the artist's taste and knowledge are both at fault, and his time and talents wasted.

It is a commonly received opinion that a man who can paint a picture is the right man to decorate a room. As a rule, there can be no greater mistake. There are of course exceptions, but it will be found that the two are distinct, and require a special education or rather experience. The man who spends weeks and months in the elaboration of a picture will be too apt to treat his wall decoration in the same manner, and will show a want of breadth, a meagreness or poverty of colouring, and a finnicking littleness in his ornamentation, totally unsuited to the situation. This arises not so much from any want of knowledge of form or colour as from a want of experience in the handling of large masses of colour. It is something like engaging a miniature painter to paint the drop scene for Old Drury. His ideas do not expand—they are bound down to a yard of canvas, consequently he cramps everything he touches. The naturalistic style of treatment as applied to house decoration is, as a rule for general application, a mistake. It is not long ago since our paper-hangings and wall decorations were treated in this manner, and we had our walls covered with large flowery patterns, in natural colours—many in Mr. Ruskin's favourite trellis patterns, with bunches of grapes and vine-leaves in most admired confusion. Our very floors were covered with carpets on which were represented wreaths and garlands of flowers as large as life and twice as natural, and we trampled them under foot without the slightest compunction. Our interiors were bowers of roses and posies, pretty baby-houses all.

At length better and more sober tastes prevailed, and we began to see that a room, to be beautiful and comfortable, and pleasant to sit in and to feel at home in, should be treated in a different manner; that bouquets of flowers and large masses of green leaves spotted over the walls were distracting objects; that our eyes were at once fixed upon them the moment we entered the room, and so long as we stayed in it, turn where we would, they were ever present, producing a sense of oppression and weariness. At last a master mind arose and took the matter in hand. A series of patterns for wall papers were designed by Mr. Owen Jones, which completely revolutionised our ideas and practice. These papers, both in form and colour, were founded on the truest and best principles of decorative art as applied to domestic architecture, and although it is now many years since they were introduced, they have never been surpassed for beauty of form and harmony of colouring, and for adaptation to the purposes for which they were designed. They taught a lesson which our architects and decorators were not slow to avail themselves of, and as a means of purifying and elevating public taste their influence has been great, and is still and increasingly felt. Yet most of these patterns were designed upon the principle which Ruskin condemns—namely, natural leaves and flowers conventionalised. It appears to have been forgotten, or else never to have been dreamt of in the philosophy of many of our art critics and their followers, that there is such a word in our vocabulary as the word adaptation—adaptation of form to the particular purpose required, and adaptation of colour to the special circumstances of position and locality; certain laws and rules are laid down, which are carried out under all circumstances and in all places. The folly and absurdity of this practice will be at once evi-

dent if we take a simple illustration as an instance.

Say a room whose walls shall be painted with a tint of colour, made from emerald or other bright green and white—a colour refreshing to the eye and pleasant to look upon, if our room is placed in the midst of a crowded city, where a green tree or a blade of grass is a *rara avis*. We shall feel refreshed every time we enter it. If we look out of a window our eyes will rest most likely upon a dusky red brick wall, not very clear or cleanly perhaps, but looking much ploasanter and better from the force of harmonious contrast. On the other hand, if we place our room in the country, where tho look out will be upon green fields or garden and lawn, and if we treat it in exactly the same manner, we shall soon begin to find the same manner, we shall soon begin to find that we have no pleasure in it, and there is ne feeling of relief felt on on the grass plat or lawn, the natural greens of the grass and trees will have a dull faded look. This effect is produced by the large mass of bright green on the walls of the room, which completely destroys the capability of appreciating and distinguishing the beautiful varieties of tints of green which nature has so bountifully spread before us. Thus we see that the same style of treatment as regards colour may be truly beautiful and harmonious in one situation, and utterly unsuitable, discordant, and out of place in another. Here also we may see the value and the necessity of the decorator being able to adapt his colouring to the particular circumstances in which the object he has to decorate is placed. Again, it does not follow that because our room is placed in the country we shall discard green altogether, for if we add sufficient red and black to the same tint of bright green, to neutralise its brightness and reduce its tone, we shall have one of the pleasantest and most harmonious wall colours we are acquainted with—a colour which not only produces a feeling of repose and quietness, but contrasts favourably with furniture of almost every description of wood, oak, walnut, mahogany, maple, &c., and almost any warm colour of drapery or hangings will harmonise well with it. The grass, and trees, and flowers, and all pure greens look fresher and brighter by contrast with it. It is a colour that interferes with nothing, but improves the colour of everything in its vicinity.

It is now pretty well understood that the aspect of a room should, in most cases, regulate the degree of warmth or coolness of the colour used on its walls and in its furnishing. This is a true principle to follow in all cases where rooms have different aspects; but the majority of our town houses especially have but one frontage, and the best rooms have all the same aspect; consequently even this law must be modified to suit the circumstances. Again, we shall find that there are many disturbing influences surrounding both country and town houses, which require a consummate knowledge of colour to overcome—reflected light, which makes everything look tawdry and garish. Overshadowing of trees, the nearness of other buildings, and many other causes, tend to break down all rules, and leave all to the skill and experience of the decorator. We consider the power of adaptation to be one of the chief qualifications of the decorator's art, and all our experience goes to prove that although there are certain laws as to the proportion which one colour must bear to another in order to produce harmony, which laws are true in themselves, yet, like all other things in this world, they must bow to circumstances and require to be modified in practice, otherwise discord would be produced.

The decorations of a room should always be subordinate to its uses. This fact cannot be too strongly insisted upon. Common sense tells us that a dining-room should not be treated in the same manner as a drawing-room, a public building the same as a private one, nor a place of business in the same style as a theatre; but that each should have special treatment of the kind best suited to the purpose it is used for. Each may be beautiful and pleasant to sit in, and yet have distinct features of its own; and it is only by the exercise of good taste and sound judgment that this desirable result can be arrived at. How often may we see the same decoration in a private dining-room and in a singing saloon, or the same ornament used for a dining-room and a shop front; or Greek and Italian ornament in a Gothic house, and *vice versa*; and in other cases a jumble of all styles together? These are errors of judgment, which generally proceed from ignorance, none the less to be condemned on that account. The blunders committed with regard to colour are quite as bad, if not worse. We commonly see green and blue mouldings and red back grounds, retiring colours placed upon advancing members, and advancing colours on sunken members.

Building Intelligence.

CHURCHES AND CHAPELS.

Cleator.—A new (Roman) Catholic Church, to be dedicated to Our Lady of the Sacred Heart, is being erected at Cleator, Cumberland, from designs by Mr. E. W. Pugin, at a cost of about £5000. The internal dimensions of the building are 130ft. by 50ft., and 75ft. across the transepts; its height being about 65ft. The church is cruciform, and it is estimated it will accommodate about 1000 persons.

Dunmow.—On Tuesday week a new Congregational Church at Dunmow was opened for public worship. The new building, which is Romanesque in style, will accommodate 900 persons. The cost has been £2450.

Elmstead Market.—On Wednesday week, the building committee appointed to carry out the erection of a new church at Elmstead Market, Essex, decided to accept the plans of Messrs. James Stannard & Co., of Leicester; the estimated cost of the church being something over £2000.

Girlington.—On Friday last, a new Wesleyan Chapel was opened at Girlington, near Bradford. The building is constructed from the designs of Messrs. Andrews, Son, and Pepper, architects, Bradford. The style is Italian, boldly treated. Externally the chapel is of stone, the external dimensions being 75ft. by 60, and the total height to the top of the pediment in front is 55ft. The front and sides of the building are all constructed of wall-stones. The pews can be divided into any number of sittings by means of moveable arms, readily removed. The chapel will seat about 900 persons. The several contracts reach a total of £4258.

Kinfauns.—A New Church at Kinfauns, N.B., was opened for Divine service on Whitsun Day. The building was designed by Mr. Heiton, architect, Perth, and its plain bold outline harmonises well with the scenery around. The style of architecture employed is that of the Early French Gothic, and the church is cruciform.

Laceby.—Laceby Church was re-opened on the 18th ult., by Archdeacon Trollope, after restoration at the hands of Mr. James Fowler, architect. The north aisle and south porch have been rebuilt, and several stained glass memorial windows inserted.

Lincoln.—Mr. Fowler, architect of S. Swithin's Church, met the Building Committee on Friday week, when, as we stated last week, it was agreed that the matter of the unsound pillars should be referred to Mr. Christian, architect, and that his decision as to whether the contractor or the architect is responsible for the same shall be final. On Wednesday week Mr. Christian inspected the building, and afterwards met the committee in the vestry-room of the old church. It was very evident, from the examination and the remarks that fell from Mr. Christian, that his opinion is that the contractor is almost entirely, if not wholly, responsible for the cracking of the pillars. Their dimensions he considers sufficient to carry a much greater weight than is imposed on them. He will forward a written report of the result of his investigation.

Loppington.—The re-opening of Loppington Church, near Wem, after restoration, was celebrated on Wednesday week. The greater portion of the edifice has been re-built, with the exception of the tower, the circular arches of which point to its Norman origin. It is now a most substantial stone building, with freestone facings; and the high pews have been removed, and in their places are the modern low-backed seats. It is also fitted up with a heating apparatus. The work has been most efficiently carried out by Messrs. Bowdler and Darlington, the contractors, Shrewsbury, from plans by Mr. E. Randall, of the same place.

Newcastle.—A chapel just built by the Primitive Methodists in Newcastle-on-Tyne was opened on Whitsun-Monday. The chapel was designed by Mr. Matthew Thompson, and is built in the Gothic style, of stone. The size is 48ft. by 42ft., and the chapel accommodates about 700 persons. The entire cost of the building has been £2600.

Thorndon.—An effort is now being made to effect a complete restoration of the Parish Church of Thorndon, which is dedicated to All Saints. The church consists of nave, chancel, and square tower. The chancel has already been restored, from designs by Mr. R. M. Phipson, architect, of Ipswich and Norwich. All the old benches have been removed, and replaced with new oaken ones with carved poppy heads. The floor has been relaid with tesselated tiles, a new east window inserted, and the old roofs of both nave and chancel removed and replaced with new stained pine waggon roofs. It is now proposed to continue the alterations and restorations to the whole of the church. The old benches will be replaced by modern ones, the west gallery removed, and a west window (at present bricked up), will be opened out. The exterior of the edifice will likewise be put in thorough repair. The total cost of the necessary works will be about £400.

Walworth.—The foundation stone of S. Stephen's Church, Villa-street, Walworth Common, will be laid on Tuesday next. The cost of the church (which is to be erected from a design by Messrs. Henry Jarvis and Son), will be about £6000 including site.

Weeley.—A new Wesleyan Chapel was opened at Weeley, Essex, on Wednesday week. The building is exceedingly simple in character, and affords accommodation for 200 persons. Mr. Leaning was architect, and Mr. N. Saunders, of Dedham, the builder. The cost is about £300.

West Hanney.—After a period of nineteen months the Parish Church of West Hanney, Oxon, was re-opened on Tuesday, by the Bishop of the Diocese. The Church dates as far back as the 13th century. The Church is fitted with stained deal seats, all of which we are given to understand are unappropriated, and are capable of seating 300 persons; under the seats it is boarded, and the aisles are laid with Staffordshire tiles. The font, which stood in some other part of the Church, has been removed to its proper position on the north side. It would appear that the font is of the same antiquity as the Church itself, and is composed of a very hard stone, called Doulting stone, similar to that with which Glastonbury Abbey is constructed. Mr. James Brooks was the architect of the restoration.

Whitfield.—About fifteen months ago, the dilapidated tower of Whitfield Church, Northamptonshire, was blown down in a gale, and the body of the building being in nearly as bad a state, the whole has been rebuilt from designs by Mr. Woodyer, architect, at a cost of £3000. The fabric was re-opened on the 24th ult.

Wombridge.—The re-opening of the parish church of Wombridge took place on Wednesday week. The old church, which was dedicated to S. Mary and S. Leonard, was a brick structure, of the most meagre character, and required so much alteration to meet the increased wants of the present day that it was decided to take it down to the foundations, except a portion of the tower, which has been re-faced. The new church is built on the old foundations, with the exception of the chancel, which has been extended. The church is cruciform in plan, and provides sitting accommodation for 350 persons. The walls are faced with Cefn stone, and the dressings are of the same material. The cost has been £2000, and the work has been carried out by Messrs. Millington and Son, builders, of Oakengates, from the design of Mr. George Bidlake, architect, of Wolverhampton.

Worcester Cathedral Restoration.—There was a meeting on Saturday at Worcester of the Committee for the Restoration of Worcester Cathedral, to receive the revised estimate of Mr. G. G. Scott as to the cost of the entire completion of the restorations, which at present are

practically suspended for want of funds. The meeting was private, but it transpired that Mr. Scott (the architect), having carefully examined the plans and revised the estimates, finds that £15,000 further expenditure will be required to complete the restoration of the cathedral. Towards this sum Lord Dudley offers £5000, conditionally on £10,000 being raised by the city and county of Worcester. It is understood that the Dean and Chapter of Worcester, in their official capacity, will contribute £2000, so that there will still be left £8000 to be provided by the public in order to be in a position to accept Lord Dudley's offer.

BUILDINGS.

BATH.—A mission hall, which has just been erected in the vicinity of the Great Western Railway Station, Bath, was opened on Thursday week. The hall is capable of accommodating 1000 persons, and has been erected by Messrs. Hibberd & Long, at a cost of £1000.

IMPROVED MODEL DWELLINGS FOR FARM LABOURERS.—There are now being erected on the Dudmaston Estates, near Bridgnorth, by the Rev. F. H. Wolryche Whitmore, a number of improved model dwellings for farm labourers. Each cottage contains a living-room, three bedrooms, entrance porch, scullery, pantry, fuel store, piggery, closet, cesspit, and ashpit. The cottages are being built of hard-burnt Broseley bricks, the external walls being hollow for dryness; and the roofs will be covered with Broseley tiles, in bands and courses, and finished with an ornamental ridge cresting. The porches will have projecting roofs carried on corbels and brackets, and the dormer windows will also have projecting roofs. The whole of the works will be finished in a complete and substantial manner. Similar improved dwellings are also now being built at Caynham Court, near Dudlow, for Sir William Curtis, Bart.; at Rowfant, Sussex, for Sir Curtis Lumpson, Bart.; at Jermyns, near Romsey, for R. G. Linzee, Esq.; at Kirby Muxloe, near Leicester, for Miss D'Oyly; and at Woodbrook, near Birmingham, for F. Elkington, Esq. These works are being carried out from the designs and under the direction of Mr. John Birch, architect, of Beaufort-buildings, London, who gained the Society of Arts premium and medal for such designs.

LIVERPOOL.—On Monday, the Earl of Derby laid the foundation stone of a new hospital, to be called the Stanley Hospital, situated in Stanley-road, Kirkdale, and intended for the accommodation of the northern districts of Liverpool. The site comprises about 8000 square yards. The main building will have a frontage to Stanley-road of 300ft. It will consist of apartments for the surgeons and officers, a dispensary for out-door patients, operating-room, and other conveniences; and a small chapel for the use of in-patients. That portion of the hospital reserved for the treatment of in-patients will be at the rear of the main building, and it will be constructed upon the cottage principle. It will consist of four wings, each containing four wards, and each ward is intended to accommodate five beds. The several wards have an elevation of 13ft., and will be so constructed as to allow of 1100 or 1200 cubic feet of air being given to each patient. The hospital will, when the design of its promoters is fully carried out, be furnished with 176 beds. For some time, however, only a portion of these will be provided. The portion to be erected first is the main building fronting Stanley-road, and one wing containing four wards, in which accommodation will be furnished for 50 in-patients, in addition to the requisite dispensaries for out-door patients. The entire scheme involves an expenditure of about £15,000. The style of architecture which has been adopted is the Renaissance, with a slight admixture of Gothic. The architects are Messrs. Wainwright and Son, of Liverpool.

SUNDERLAND.—On Tuesday the corner-stone of the Ayre's Quay Mission and Temperance Institute was laid at Sunderland. The style of the building is somewhat of a Gothic character, carried out with red bricks and freestone dressings. The total cost of the building, including purchase of site, will be about £600, and accommodation will be provided for about 400 people. Mr. John Tillman, of Sunderland, is the architect, and Mr. Robert Hutchinson, the builder.

TOPSHAM.—A new Masonic Hall was dedicated on the 31st ult., at Topsham, Devonshire. The hall is 50ft. long by 25ft. wide, and 20ft. high. The structure, though very simple and unpretentious externally, has a highly ornate interior. The architect is Mr. Harbottle, and the builder Mr. John Moass, of Exeter.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

RECEIVED.—C. H. B.—W. M. and Co.— W. S.—J. C.—R. W. B.—J. B. T. Peake—J. A.—C. Pease—P. and Sons—G. T. M.—G. F.—E. S.—H. G.—J. H.—W. G.—Rev. E. T.—W. R. S.—W. Bidlake.

W. T.—Please send the drawing.

W. FLOCKHART.—With sketch of south entrance to crypt of Glasgow Cathedral.

T. R. and G. W.—Letter forwarded to Moyr Smith.

Correspondence.

IMITATIONS OF WOOD AND MARBLE.

(To the Editor of THE BUILDING NEWS.)

SIR,—I have read with interest the practical papers on Furniture and Decoration, but wish the writer had not stepped aside to break a lance with Mr. Ruskin. The last paper professes to enlighten your readers on the "use and abuse" of imitations of wood and marble. On that vexed subject it really throws no light whatever, and it might as well have been entitled "The Abuse of Mr. Ruskin," and those who think with him that decorators have very little knowledge and less of love for colour and grace of form, who cannot decorate a room or wall without having recourse to the imitation of wood or marble. In trying to unseat the iconoclastic Ruskin he is too evidently mounted on a hobby of his own (to my eye a very inferior charger in every way), and, for lack of better weapons of offence, has also pelted him with what is, logically speaking, "dirt." He does not seem at all to have apprehended the drift of the passage he begins by quoting, and should not have tried to vex Mr. Ruskin's wit till he had fathomed it. Newton, it is said, considered all good poetry to be splendid nonsense; but I am persuaded that a great truth underlies the "arrant nonsense" of Mr. Ruskin's poetic exaggeration. Certainly there is nothing in the paper alluded to, to shake any one's conviction of the truth that the true interests of internal decoration will be only furthered by discouraging the practice of laborious imitations of wood and marble.

The only thing that looks like argument is the dictum of Owen Jones, that imitations are allowable wherever the real material might be employed. If this is not a mere commonplace caution against the improper use of imitative wood or marble, it is, I need not say, an appeal to an authority which may be used as powerfully upon the other side; for the question really is not whether such imitations are allowable at all, but whether it be not better in every case to trust our decoration to the simple beauty of colour enhanced, when it can be done, by ingenious combinations of stencilled or painted forms. Were this principle encouraged, I am certain that our walls and finishings would soon become far more lively in colour, and more interesting in variety of ornament, than they can ever possibly become if we persist in copying, however faithfully, the varnished grains of wood or marble. Against this result Owen Jones would be the very last to protest, when he has done so much to help our artists to effect it.

Practically, there are some imitations which on his own principles escape Mr. Ruskin's censure. Wainscoat imitation well varnished is a durable and economical style of decoration in many cases. In this instance there is no great expenditure of either time or skill, as the general effect of broken colour is obtained without any very close approximation to the real graining of the wood. But take another case: I have seen a room elaborately decorated in walnut imitation, and when I saw the havoc made upon its beauty (as by the abrasion of the blind cords) I could not help reflecting that here was a very evident instance of the abuse of the imitation principle. I have seen unseemly attempts to copy bird's-eye maple, and am quite sure that to execute such an imitation with anything like artistic fidelity involves an expenditure of time in training and in execution by no means commensurate with the result.

As to the frightful list of consequences that are to follow from the abandonment of imitation woods and marbles to the limbo of vanities where they are consigned by Mr. Ruskin, I am not afraid of them. They remind me of the story of the clergyman of a small burgh in the north who was, with others, much annoyed at the carelessness of the authorities in not attending to the proper regulation of the church clock, which never kept time and misled the worshippers. Meeting the provost one day, he spoke to him of the shame he ought to feel in allowing the clock of such a sacred edifice to be continually telling a lie. He made good his point, and extorted confession from the provost, but the latter retorted by turning to the doctor and observing that he had really a very fine head of hair under his hat. "Hair," said the doctor, "man, that's a wig." "A wig! oh doctor, how can ye preach wi' a lie on your head?"

I am sure Mr. Ruskin would not be so cruel as to tear off the wig and recommend a skull or smoking cap. Nor would he wish to rob any home of its homely ornament; he would only have the artist spend his energy in a better way and decorate even humble homes to better purpose. Finishings are not to be varnished in order to exhibit ugly knots. Pokers are not to be simple bars of iron, and may be enriched in their necessary mouldings, without offending taste. *Punch* may represent articles of furniture as gentlemen and ladies, but art never decorates them so as to make them appear what they are not. As for the mantlepiece, if the painter cannot devise any style of decoration other than by making it (too often a mockery) of marble—the more's the pity—and truly Mr. Ruskin is right when he avers that it says little for his love of colour or of form if by a plain shade or lines or forms of contrasting colour, he cannot produce something which will not be perpetually reminding the gentleman who toasts himself before it that he wants the thing he cannot get, "a marble mantlepiece."

As for ceiling cornice decoration, as there is no structural necessity for plaster cornices at all, the wig may be removed in this case—and half the cost of decoration saved—by floral or other tinted decoration. In a word, the Ruskinian position seems to be intact, and would, if in loving hands, make the barn a palace. It would leave the artist free to choose a field for decoration where there is endless scope for his fancy, where the hope of discovery might cheer him on, and where he would find exercise for his taste amid the infinite varieties of his chromatic scale, and the exhaustless beauty of the form of nature. This course, if it were followed, would naturally, in so many different minds, lead to far greater beauty and variety in the result than can ever be obtained by adhering to the imitation of a single model or at most of two or three samples, of wood or marble.

And which system would tend most to the development of a better decorative system, I leave it to your readers to decide.—I am, Sir, &c.

Edinburgh, June 6th, 1870. J. R. W.

SIR,—On behalf of, I hope, a goodly number of your readers, permit me to offer a few remarks in reply to some of the passages contained in your last issue, in an article upon "The Use and Abuse of Imitations of Woods and Marbles, &c., &c., in House Decoration."

The writer is doubtless an excellent authority upon the subject, or at least should be, before giving the public such very strong-minded opinions to digest. At the outset he pronounces judgment upon Mr. John Ruskin by describing a passage taken from his writings as "a piece of the most arrant nonsense." Surely an art critic rarely adopts such broad language in expressing his opinions of the works of another, though a lesser star than himself, for is not humility rather than egotism the outgrowth of the true study of art?

He then proceeds to enlarge upon the beauty and usefulness of imitative art, and the painting of would-be oak doors or marble columns, and it must be admitted that some passages of the article are quite sublime, apart from the grainer and marble painter's plea; but is it fair to compare the imitative art found in the paintings of the old masters with the present mechanical method

of imitating wood and marbles in "oils and tarps?"

It is quite true that all art must be imitative, more or less, for without the representation of objects around us, a comprehensible picture could scarce be formed, unless it was a "Showman's Red Sea," but the graining of doors or painting of sham marble mantlepieces is generally done without any resemblance to the natural object. Perhaps the subjects are supposed to be conventionally treated. In any case it is very rarely one sees a grainer with a piece of the natural wood or marble by his side as a copy; and whilst it is true that the old masters attained such perfection in the elaboration of their pictures, that we feel inclined to touch them or think them realities, yet look at the gin-shops bedizened with the most elaborate of fancy imitation marbles, and doors resplendent with the graining of impossible woods. Can we be deceived by these, or suppose them real?

All graining of woods or marble painting is a sham, and cannot rightly be considered as a laudable or desirable branch of imitative art. Such work frequently covers some natural though it may be humble material, which, if finished and beautified in its natural state, would present a far more pleasing appearance than the gaudy covering in which it is clothed.

Far better is it to employ plain colours if paint must be used, properly picked out and relieved, for this is honest work; but the hideous attempts at marble painting around us—are they, as a rule, imitations of nature, or only freaks of the journeyman's brush fancy, full of many-coloured lightnings and suggestive of the nightmare and horrid dreams.

The writer of the article, in alluding to staining and varnishing, mentions the fact of having frequently noticed "great ugly blotches of resinous knots—many the size of the crown of one's hat" in such work. Surely wood of this kind must be a curiosity, or the writer's hat is smaller than those in usual wear. He also says of the same class of work, that "everybody soon gets tired of it, and have at last to resort to painting and graining to cover this abortion." Now, certainly, this is untrue, unless "everybody" means some few persons known to the writer, for it is not often that stained and varnished work is painted over.

Why should we cover up good and naturally-grained wood with a mask at once useless and unnecessary? Thus deal is made to wear the supposed imitation of oak, maple, walnut, and other woods. Why not at first carefully prepare, stain, and varnish the genuine wood? and thus beautify nature, rather than, after covering her up, seeking to imitate where imitation is not required?

The staining and varnishing of joinery has many advantages which painting has not. Thus bad wood can be easily detected, and will not so often be used, as in work sent from the shop already skimmed over with a priming coat of paint.

Staining and varnishing, too, is an occupation far more healthy than that of painting, the injurious effects of which are seen in nearly all house painters. People call them an essentially lazy class of men. It is not really so, but their work brings on a certain chronic lassitude which they cannot shake off, and it results from the effects of the ingredients of the paints they daily use.

Again, is there anything much more offensive to endure than a house in course of being painted, or even some little time after it has been finished? but with staining and varnishing all disagreeable effects are gone when the varnish is dry; and what of the appearance of the two kinds of work done? There is a natural luminous transparent bright effect, with staining and varnishing, unattainable in oils, though they may be more glaring and showy in colour.

Supposing a door to have been carefully stained and varnished, it is then capable of receiving much additional finish. For instance, a stencil ornament, in black or suitable colour, may be put on the panels. The bead mould may also be picked out in black and gold, and then a coat of varnish, as a finish to the whole, will give the appearance of inlaid work. All this may be done in less time than it takes to paint and grain the door, and the work will be much superior to the latter in every respect, especially as a sample of art workmanship, outlasting painting, and only requiring an occasional coat of varnish to renew it.

The writer of the article concludes with these words:—"If we are to banish all imitations from amongst us, our homes and hearths will, for the present at all events, lack attractions which they might otherwise possess." This is evidently intended to apply to the subject of imitation generally. Let not the writer be alarmed that "our homes and hearths" will suffer by a little less imitation amongst us, and a little more that is true, and genuine, and real.

I fail to see why a man should not feel quite as comfortable and happy at home if his door be finished in its natural state, and sitting at his fireside with a stone mantlepiece, as if both door and mantle were painted as shams.

The fear we need to have is, that in our English homes the love of imitation and seeming grander than we really are, too often like the paint, enshrouds our better and real nature, and leads to an artificial or superficial mode of living, bringing no happiness with it. The outside is often a semblance of precious marble, whilst the inside is of no comparative value.

We cannot all have diamonds, precious stones, and jewels; then let us have no paltry imitations of them, for what use are they, except it is a bad one—that of exciting envy? There are peculiar riches for each and every class in the social scale. Let us seek out ours, and contentment will help us to find them—but clothe the simple-hearted peasant in purple, and give him wealth, happiness would leave him, as if he were a poor lark confined in a gilded cage.—I am, Sir, &c.,

Birmingham. W. T. F.

S. SWITHIN'S, LINCOLN.

SIR,—I will not attempt to follow the article which appeared in your last issue, but simply give you a few facts. The pillars of the nave arcades are of Ancaster stone, 2ft. diameter, of alternately circular and octagonal section, containing an area to the circular ones—the smallest—of 453·009in. The weight of the clerestory and roof on each pillar I estimate at 60 tons, or 2·649 cwt. per inch of area. Mr. Huddleston, a local builder of some considerable experience, and a member of the committee, states that there is about 40 tons of walling on each on the north side, and 38 tons on the south side; to this must be added the weight of the roof—not 20 tons per pillar, certainly—so that my estimate is in excess of his. Now, if published tests of the quality of stone are worth anything—and it is upon these only that architects can depend in calculating for weight, &c.—I give you the following:—In the experiments made by Messrs. Poole and Son, in Oct., 1864, on Bath-stone, it was shown that a weight of about 80 tons might be considered safe per foot (some specimens not showing damage until upwards of 120 tons per foot). The report of the Royal Commission states the cohesive power of Bath (Box) stone at 5·313 cwts., and of Ancaster at 8·349 cwts.; and if Bath will carry 80 ton, Ancatster should carry 128 tons or these pillars of 3 1-6ft. area should carry 405 tons; and a stone of which the cohesive power—not the crushing power—is 8·349cwt., ought not to crush with a weight of 2·649cwt.

In some experiments made by Messrs. Poole also, on Ancaster stone, the crushing weight for these pillars would be upwards of 391 tons.

In some made by Mr. Lindley, the owner of the Mansfield quarries, the crushing weight of Ancaster stone is given as 18·33cwt. per inch, or about 7 times the weight of these pillars, viz.: 415 tons.—I am Sir, &c. JAS. FOWLER.

ARCHITECTS AND THEIR CLIENTS.

SIR,—In answer to your correspondent "Justice,"—who, by-the-bye, has chosen a most inappropriate *nom de plume*—I wish to make a few remarks. It is very evident, from the hackneyed and fallacious statement contained in "Justice's" letter, that he has not been in the habit of employing an "architect," as it is neither the custom of the profession to certify the balance of the builders' account immediately on the completion of the work, nor to go into such absurd minutiæ on the plans as to trace the course of gas pipes and bell wires.

If "Justice" gives instructions to an architect to build him a certain house, and it is done in accordance, "Justice" has all he covenanted with the architect for. The drawings are made for the purpose of showing the builder what "Justice" requires, and these with any details that are made at the completion of the work are sole property of the architect.

"Justice" has as much right to claim the drawings of his house as he has, in the event of having a case argued in court, to claim a short-hand writer's notes, simply because it was his case.—I am, Sir, &c. FAIR PLAY.

Cambridge, June 5th, 1870.

Intercommunication.

QUESTIONS.

[1865.]—STAINED GLASS.—Would any of your readers recommend me a small treatise on "Stained Glass" as an art study?—H. R.

[1866.]—CLEANING GRANITE ASHLAR.—Would any of your readers inform me of the best means of cleaning the face of some granite ashlar work, which has been discoloured by the action of a city atmosphere for many years? I wish to avoid the expense of chiselling the stone if possible.—W. M. M.

[1867.]—LABOURERS' COTTAGES.—Can any of your readers inform me whether the Royal Agricultural Society offer prizes for the best designs for labourers' cottages this year, or not? If it does, to whom to apply to for conditions, &c.?—NORTH COUNTRYMAN.

[1868.]—QUARTZ CRUSHING.—Will any reader tell me where and how I can obtain reliable information as to the machinery used in Australia and California for crushing the quartz and separating the quartz from the gold?—TOM BROWN.

[1869.]—STRENGTH OF BEAM.—Would some one kindly inform me the safe load that can be placed on the following size of beam, 11ft. between supports, and how it is ascertained?—web 10″ × ⅜″; angle irons 3″ × 3″ × ½″; wood flitches 10″ × 4″ bolted to girder?—J. R.



[1870.]—HALF TIMBERED HOUSES.—I should be glad to know of some preservative dressing for the timbers of the above, which would give them a dark brown colour, and not hide the grain of the wood as paint does?—H. B.

14, Mill-street, Maidstone.

STAINED GLASS.

ALTON.—The new east window for the parish church, by Capronnier, of Brussels, was unveiled on Monday week. The subjects represented are the Ascension and Baptism of our Lord, and the Last Supper. The window consists of five lights. The glowing testimony of the local journal to the merits of the window is rather unfortunately worded. "The colour and tone are in admirable keeping," and the figures "resemble painting on Sevres china more than anything else!"

STATUES, MEMORIALS, &c.

THE WOLSEY CHAPEL AT WINDSOR.—The works undertaken by the Baron de Triqueti, at the command of the Queen, in the Wolsey Chapel at Windsor, are now far advanced. The walls, right and left, are filled with marbles, and only the east end, where the Baron intends to concentrate all the force of colour at his disposal, is vacant. At a sufficient distance from the ground to admit of seats being fixed beneath them, range, panelled on either side, a series of scriptural subjects selected by the artist as illustrative of the acts and virtues of the late Prince Consort. In reference, for instance, to the interest taken by the Prince in the matter of popular education, we have Jehoshaphat directing the teaching of the people by the princes, priests, and Levites. These pictures are executed in inlaid marbles and lithographic stone, which affords a very valuable tone for decorative purposes. The cartoons for them, on completion, are transferred to the marbles, which are then deeply etched, and the lines filled in with a composition (unlike the mastic previously used) as durable as marble itself. Each picture is bedded in a deep-toned marble framework, inlaid with floral designs, and enriched by small reliefs in white, and by medallions in red marble of the obverse and reverse of the coins of the year in which the event depicted happened. For instance, beneath "The Agony in the Garden" the obverse and reverse of the coin of Tiberius occur. Derbyshire spars employed occasionally in this portion of the work impart an unlooked-for brilliancy to the whole. White marble medallions of the children of the Queen and Prince, executed by Miss Durant, are introduced above each picture, and separating each, but embedded in the same decorative frame, come reliefs of the various virtues.

A MONUMENT TO LAMARTINE.—The committee for the construction of a monument to Lamartine at Mâcon has decided upon erecting a statue in the Place d'Armes. It is to be 10ft. 9in. in height, including the plinth. The cost of the whole will be £2000, and a competition will be opened for the execution of the work. The author of the design selected will have the superintendence of the erection; the second will receive £60, and the third £40.

BEQUEST OF PAINTINGS TO THE NATION.—Mr. John Meeson Parsons, formerly of Angley Park, Kent, whose will has just been proved, has bequeathed to the National Gallery, London, 100 oil paintings, to be selected from his collection by the trustees; and has left to the British Museum, and the Museum of Science and Art, many valuable articles.

Our Office Table.

EGYPTIAN ANTIQUITIES.—On Tuesday night there was exhibited to a select party of ladies and gentlemen, at the rooms of the Syro-Egyptian Society, Hart-street, Bloomsbury-square, an extensive and at the same time curious collection of Egyptian antiquities, which was formed by the late Mr. Hay, of Linplum, East Lothian, during five years' residence in Egypt. The catalogue includes more than a thousand specimens, comprising objects in bronze and other metals, in marble, alabaster, limestone and sandstone, in wood, terra-cotta, vitreous ware, and porcelain, besides amulets, emblems, and trinkets in great numbers, with mummy coverings, domestic miscellaneous objects in glass and papyra, and other vegetable objects. As might be expected, there are many specimens of the god Osiris, and several of the god Amun, of the Ptolemaic period; one of the figures being of the time of Rameses II. There were also several figures of the god Horus, and a curious one of Chonso, the Ttah of Thebes, an extraordinary work in metal. Another curious figure was that of the goddess Pasht, the cat-headed goddess with her shield in her right hand, and her left extended. One rare mummy figure attracted considerable attention. It was only six inches high, and in limestone, but it represented the figure of a mummy with seven horizontal lines of incised hieroglyphics, the hands in front clasping a human-headed bird representing the figure of the soul coming to reanimate the body. There was a vast number of mummy figures, and trinkets, amulets, and charms without number, the uses of which were explained by Mr. Bonomi, the learned curator of Sir J. Soane's museum, and by Mr. Black, the well-known antiquarian of the Record-office, who was called to the chair.

COMPLETION OF S. PAUL'S.—It has already been announced that the scheme for the completion of S. Paul's, commenced by the late Dean Milman, has lately been revived, and is now being prosecuted with considerable vigour. A very influential committee, consisting not only of some of the leading men in the City, but of persons high in Church and State, and distinguished for their knowledge and practice of art, has been appointed, and is now hard at work. A public meeting, in furtherance of the scheme, will be held at the Mansion House, under the presidency of the Lord Mayor, on Wednesday, July 13, when the Bishop of London, the Bishop of Winchester, Mr. Gladstone, Mr. Gathorne Hardy, and others have promised to speak.

LINCOLN DIOCESAN ARCHITECTURAL SOCIETY.—This year's anniversary of the Lincoln Diocesan Architectural Society will be held at Boston, and will commence on Thursday week, under the presidency of the Bishop of the diocese. After divine service in the parish church at 9.30, Archdeacon Stowe will describe that building, after which an excursion will be made to the following churches, which will also be briefly described by the venerable archdeacon:—Wyberton, Frampton, Kirton, Sutterton, Algarkirke, Wigtoft, Donington, Bicker, and Swineshead, returning to Boston about 6 p.m. Later in the evening there will be a meeting in the Assembly-rooms, under the presidency of the bishop, when a number of addresses, &c., are to be delivered, among which will be papers by Prebendary Blenkin, "On Boston in 1621," and "On the Monuments in Boston Church," by M. H. Bloxam, Esq. On Friday, the following places will be visited:—Hussey Tower, Skirbeck, Fishtoft, Freiston, Benington, Leverton, Leake, and Wrangle. At 6 p.m. the annual public dinner will take place, Lord Kesteven in the chair. In conjunction with the meeting of the society in Boston an exhibition of antiquities, &c., will be held in the Corn Exchange.

THE UTILISATION OF SEWAGE.—The admirable works at Hastings for the utilisation of the town sewage and the purification of the effluent water before it flows into the sea have excited much interest among those who have watched the progress of sanitary reform. Within the past week several deputations have inspected the works. Among them, we may mention the Provost of Aberdeen and the engineer of the harbour, a deputation from the Clyde Navigation Commission, a large number of gentlemen representing the Local Board of Health of Chester and other towns, some members of the Rivers' Commission, and an importan deputation from Holland, consisting of Baron du Tone de Bellinchane, Chamberlain to the King; Baron de Hardenbrock de Bergambracht, and the architect to the Council of the Hague. They have strongly recommended the adoption of the process at Scheveling.

LONDON MARKET ACCOMMODATION.—"It is really marvellous" (remarks the *Food Journal*) "that the great Metropolitan market in Covent-garden should possess far less accommodation than the markets of many a provincial town in our own or foreign countries, not to make odious comparison with splendid markets such as those, for example, of Paris. London notoriously requires more commodious markets than it possesses, and nowhere is this great want so keenly felt by all concerned as in Bedford-land." We may refer, in this connection, to Farringdon Market, of which a great deal of the available space has remained for years unoccupied. The new street from Holborn-circus to the bottom of Ludgate-hill will pass by (if it will not actually cut off) the south-west corner of the market, and this improved approach to the market will do much, we believe, to make it what it has not hitherto been—a success. At any rate, the declivity of Stonecutter-street and the narrowness of Shoe-lane will no longer be impediments.

LONDON WALL-PICTURES.—Mr. F. R. Conder, writing in the *Art Journal*, justly holds up to ridicule the enormities in the shape of advertisements which cover the hoardings and blank walls of the Metropolis, and gives good reasons for the belief he expresses that there is ample room for the artistic treatment of the graphic advertisement. "Every business," he says, "has its secrets, and it may be that the advertisement which is most offensive to the eye and taste is the most remunerative to its designer. But we should like to see the other tack tried. We are mistaken if it would not succeed. A good picture, rough and bold, but designed and executed by a real artist, could not fail to attract public attention. We would back one such good one against any dozen of existing bad ones. Let us deliver our walls from the reproach of the billsticker. Let us have advertisements at which it is a pleasure to look; and the object of the advertiser will be attained far more certainly than by the present incontinence of type and abuse of pictorial pretensions." We understand that an artist of Paris, who has established fame in the great capital of taste, is now occupied in producing "wall-pictures" for several London wall-advertisers.

Chips.

On Saturday week the foundation stone was laid of a new church at Kilgraston-road, Whitehouse. The church, which is to cost £6000, is intended to perpetuate the memory of the late Dr. Robertson.

Miss Brackenbury, of Brighton, has given £1000 towards the completion of the new buildings of the Manchester Grammar School.

S. Paul's Church, Addiscombe, near Croydon, is about to be completed by the erection of a tower.

Two large buildings are now far advanced in Constantinople—the Orphan Asylum, founded under the auspices of the Grand Vizier Aali Pasha, and the Mosque by which, according to ancient custom, the present Valide Sultan, or Sultan mother, celebrates her fame.

The Scientific Buildings Committee are about to have a plan designed for their proposed building.

A theatre for the people is to be built at S. Petersburg, a Royal Commission having been entrusted with its construction. It is to accommodate 2350, and the charges for admission are to range from 6d. upwards. The cost is estimated at about £33,000.

The Metropolitan Board of Works has decided that the name Victoria Embankment shall be applied to the Northern Thames Embankment, and Albert Embankment to that on the south side of the river.

Is Leicester-square really about to cease to be an eyesore? It would seem so. A City firm write to the *Times* that they hold on "behalf of a client a contract for the purchase of the freehold;" that it will "soon be completed;" after which the land is to be let "on building leases."

The Lee Burial Board have decided on laying out their new cemetery on the plan of that at Charlton, the church and chapel to be after the style of those at Forest Hill Cemetery. Mr. Milner, of Dulwich, and Mr. Thorne, of Lee, will be deputed to prepare the plans and estimates.

Mr. W. H. Houldsworth has undertaken the expense of restoring the old rood-screen of Manchester Cathedral.

Mr. Assheton-Smith has given £1000 to the restoration of Bangor Cathedral.

The directors of the Crystal Palace Company have made arrangements for an Exhibition of Church Furniture and Ecclesiastical Art, with prizes of from £1 to £15 for the best floral and other devices and designs for the decoration of churches on festival occasions. The Exhibition will be held in the north (Tropical) end of the Palace, commencing on Saturday the 16th of July, and terminating on Friday the 22nd. There will be two sections—the first for manufacturers, the second for amateurs. Ladies are eligible to compete in all classes.

Lord Talbot de Malahide will preside at the Congress of the Archæological Institute at Lincoln next month.

An experiment with gun-cotton was recently made at Rye. The martello tower No. 36, the walls of which were 12ft. thick at the base, were entirely demolished by 200lb. of gun-cotton, divided into three charges, and fired simultaneously by electricity. The gun-cotton was in 5in. discs., and none of the débris was blown away to the extent of fifty yards from the building.

A new organ was opened last week in the parish church of S. Mary, Winterborne Whitchurch. Messrs. Walker and Son, of Tottenham Court-road, are the builders.

The new Independent College at Taunton will be opened on the 14th inst.

The annual soirée of the Royal Academy is fixed for the 28th instead of the 29th of this month, as originally intended.

The new church of S. Matthew, S. Mary's-road, Southampton, was consecrated on Saturday last.

Timber Trade Review.

Messrs. Churchill and Sim's Sale on the 8th, at the Baltic Sale Room, Threadneedle-street, consisted of

23,000 spruce deals, &c.
47,000 Quebec pine deals, &c.
40,000 Swedish deals and battens.
80,000 Norway deals and battens.
4,400 Finland deals and battens.
1,700 St. Petersburg and Onega deals.
1,400 pitch pine planks.
160 000 Prepared flooring and match boards.
6,300 French Norway spars and poles.
330 Riga wainscoat logs.
100 Fathoms lathwood.
130 Loads Norway and Swedish balks.
200 Loads Quebec red pine.
200 Loads Quebec waney board yellow pine.
200 Loads Quebec yellow pine timber.
80 Loads Quebec elm timber.
1,000 Loads Pensacola Pitch pine timber.
90 Loads Swedish fir timber.
900 Loads Dantzig fir timber.
60 Quebec red pine spars.
11 Oregon pine masts, &c., &c.

	£ s.		£ s.
Bjorneborg yellow 2½ × 7....Petg. std.	6 5	to	6 15
Christiana 1st yellow 3 × 9 ....120 12ft.	19 0		
Do. 2nd 2½ × 6½	6 15	„	7 5
Do. 3rd 2½ × 6½	6 5	„	6 10
Do. 1st white, 2½ × 7	7 10		
Do 2½ × 6½	6 10		
Do. 3 × 9	17 0		
	s. d.		
Do. fresh spars 4 to 6 in. .....foot run	0 1½		
Do. under 4in.	0 ⅝	„	0 ¾
Do. 22ft. poles .....each	1 0		
	£ s		
Drams 2nd yellow, 2½ × 6½ .....120 12ft.	6 10	„	7 0
Do. 3rd do. 2½ × 6½	6 0	„	6 10
Do. 3rd white, 2½ × 6½	5 0	„	5 10
	s. d.		
Do. yellow balks .....per load	27 0		
Dantzig undersized fir.....	49 0		
	£ s.		
Escoumains 1st spruce 3 × 9 ..120 12ft.	14 15		
Do. 3 × 7 and 8	13 0		
Do. 3 × 7 to 13	12 0		
Do. 2 × 6 to 11	12 10		
Fredrickshald 1st white 3 × 9	14 10	„	15 0
Fredrickstadt 3rd yellow 2½ × 6½	6 5	„	6 15
	s. d.		
Do. slating laths ¾ × 2½ .....144 ft.	1 8		
	£ s.		
Georgia pitch pine 4 × 11 and 13 Petg. std.	12 15		
Do. 3 × 11	12 15	„	13 0
Gothenburg 1 and 2 white	8 15		
Do. 3rd 4 × 9	7 5		
Do. 3 × 11	7 15		
Do. 2½ × 7	6 15		
Do. 3rd yellow 4 × 6	7 5	„	8 5
Do. 3 × 9	8 5	„	9 0
Do. 3 × 7	8 0	„	8 5
Do. 2½ × 7	7 10	„	8 10
Laurvig 1 and 2 white 3 × 9 ..120 12 ft.	12 0		
Onega 3rd yellow 3 × 9 .....Petg. std.	8 10	„	8 15
Oregon pine masts .....load	7 5	„	7 10
Petersburg 2nd yellow 3 × 11 Petg. std.	9 5		
Do. discoloured do.	9 0		
Do. 1st white 3 × 7	8 10		
Do. lathwood 8 ft. .....fathom	5 15		
Paskallavick lathwood	4 0	„	4 5
Tugwash spruce 3 × 9.....120 12ft.	11 15	„	12 0
Pensacola pitch pine 4 × 9 to 6 × 12 Petg. std.	11 5		
Do. 3 × 11 to 15	11 5		
Do. 3 × 6 and 10	10 15		
Do. 2½ × 8 to 15	10 5		

	£ s.	£ s.
Quebec 1st bright yellow pine 12ft. 3 × 11 Petg. std.	18 10	to 18 15
Do. 13 to 15ft. 3 × 11	18 5	
Do. 10 and 11ft. 3 × 9 and 10	16 5	
Do. 10 to 14ft. 3 × 7 to 10	15 15	
Do. 6 and 8ft. 3 × 7 to 25	14 10	
Do 10 and 11ft. 3 × 11	15 15	
Do. 10 to 14ft. 3 × 9 and 10	15 15	
Do. 10 to 12ft. 2 × 7 to 16	16 0	
Do. 10 to 12ft. 2 × 7 to 17	16 0	
Do. 10 to 14ft. 2 × 7 to 16	15 10	
Do. 10 to 12ft. 2 × 8 to 15	15 15	
Do. 13 and 15ft. 2 × 7 to 13	15 15	
Do. 6 to 8ft. 3 × 11 to 24	14 5	
Do. 6 to 8ft. 3 × 7 to 18	14 5	
Do. 10 to 12ft. 2 × 9 to 19	15 10	
Do 1st floated 12ft. 3 × 11	16 0	
Do. 12ft. 3 × 9 and 10	13 0	
Do. 8ft. 3 × 11 to 21	12 15	
Do. 1st dry floated 12ft. 3 by 11	17 0	
Do. 10ft. 3 × 7	12 5	
Do. 10 and 11ft. 3 × 7 to 10	13 0	
Do. 8ft. 3 × 11	13 0	
Do. 2nd bright 12ft. 3 × 11	12 15	
Do. 10 and 11ft. 3 × 11	10 10	
Do. 10 to 16ft. 3 × 9 and 10	10 15	
Do. 10 to 16ft. 3 × 7 × 8	10 5	
Do. 13 to 11ft. 3 × 7 to 12	10 15	
Do. 6 to 8ft. 3 × 7 to 19	10 10	
Do. 2nd floated 12ft. 3 × 11	12 0	
Do. 2nd dry floated 12 ft. 3 × 11	12 10	
Do. 3rd floated 12ft. 3 × 11	9 5	
Do. 10ft. 3 × 8 to 20	9 0	
Do. 3rd dry floated 12ft. 3 × 11	9 15	
Do. 1st floated red pine, 12ft. 3 × 11	12 0	
	s. d.	£ s.
Quebec waney yellow pine board timber load	80 0	„ 82 6
Do. yellow pine timber	82 6	„ 85 0
Do. red pine timber	72 6	„ 75 0
	£ s.	
Rimouski 1st spruce 3 × 9 ....120 12ft.	13 15	„ 14 5
Do. 3 × 8	12 0	
Do. 3 × 7	12 10	
Riga crown legs.....18ft. cube	4 17	„ 5 0
Do. Dutch logs	4 0	
Soderham 2nd yellow 3 × 9 ..Petg. std.	8 10	
Do. 1st yellow 3 × 9	10 10	
Do. 3 × 7	9 0	
Do. 3 × 8	9 0	
	s. d.	
Do. Fir timber.....load	52 0	„ 53 0
	£ s.	
St. John's spruce, 3 × 15 to 17 120 12ft. 3 9	13 0	
Do. 3 × 14	13 0	
Do. 3 × 13	12 15	
Do. 3 × 12	12 15	
Do 3 × 9	12 15	
Schien 1 and 2 yellow 2½ × 7 Petg. std.	7 0	
Do. 1 and 2 white 3 × 9 .....120 12ft.	11 10	„ 12 0
Uddevalla 1 and 2 yellow 2½ by 7 Petg.std	8 15	„ 9 0
Do. 3rd yellow 3 × 7	8 0	
Do. (short) do.	6 10	
Do. 2 × 7	8 5	
Wyburg first yellow 3 × 7	8 5	
Do. 2½ × 9	9 5	
Do. 2½ × 7	9 5	
	s. d.	
Christiana 1st yellow flooring, grooved tongued and beaded ¾ × 6½ ....square	7 0	
Dram 2nd white prepared flooring 1 × 6½	6 3	
Gothenburg 1st white, do., G. T. and B, ¾ × 7	7 0	
Narva prepared yellow ⅞ × 6½	7 6	
Do. 1st yellow, G. T. and B., ⅞ × 6½	6 6	
Do. 1st white do. ⅞ × 7	6 9	„ 7 0
Uleaborg 1st yellow do. G. T. and B. .. ⅞ × 7	6 3	„ 6 6
Fredrickshald 1st prepared yellow .. ⅞ × 7	7 8	0
Do. ⅞ × 6½	8 3	
Do. ¾ × 6½	7 3	
Do. 1st do. white ⅞ × 7	8 3	
Do. ⅞ × 6½	8 3	
Fredrickstad 1st prepared yellow 1¼ × 6½	13 3	" 13 6
Do. 1 × 7	9 9	
Do. 1 × 7 and 6½	10 6	
Do. ⅞ × 7	8 3	
Do ¾ × 6½	6 3	„ 7 0
Do. 1¼ × 7	13 6	
Do. ⅞ × 6½ and 7	8 3	
Do. 1 × 6 and 7	9 3	
Do. ⅞ × 6½	8 0	„ 8 3
Do. 2nd prepared yellow 1¼ × 6½	10 3	„ 10 6
Do. 1 × 6½	8 0	„ 8 3
Do. 1 × 6 and 7	7 3	
Do. 1 × 7	8 0	
Do. ¾ × 5 to ⅞ × 6½	5 9	
Do. G. T. and B ⅞ × 5½	6 0	
Do. ⅞ × 9	6 0	
Do. 1 and 2 prepared yellow 1¼ × 7 ..	10 3	
Do. 1¼ × 6½	9 9	
Do. 1 × 8	7 6	
Do. 1 × 7	8 0	
Do. 1 to 6½	7 9	„ 8 0
Do. 1 to 6	7 3	
Do. ¾ × 5 to 7	4 9	
Do. ⅞ × 7 and 8	6 9	
Do. ⅞ × 6½	6 3	
Do. 1 and 2 prepared white 1 × 8	7 6	
Do. ⅞ × 6½ and 6½	6 6	
Do. ¾ × 5 to 7		
Do. yellow and white ⅞ × 5	6 0	
Do. 1st prepared white 1 × 9	9 6	
Do. 1 × 6½	8 0	„ 9 6
Do. 1 × 8	6 9	
Do. ¾ × 6 and 7	5 6	
Do. second prepared white 1 × 6	6 9	
Do. ¾ × 6 to ⅞ × 7	5 9	
Do. 1st white G. T. and B. ⅞ × 6½	5 0	
Do. G. and T. ⅞ × 6½	7 6	
Do. 1st yellow G. and T.		
Do. 1 × 6½	9 0	
Do. 2nd yellow G. T. and B ¾ × 6½	7 6	
Do, ⅞ × 6½	6 3	
Fredrickstadt 2nd yellow G. T. and B. ⅞ × 5 and 6	s. d. 4 9	
Do. G. and T. 1 × 6½	8 3	
Do. 1st and 2nd white G. T. and B. ⅞ × 5	6 0	
Do. ⅞ × 6 and 7	5 6	
Do. ⅞ × 6½	5 0	
Do. G. and T. ⅞ × 6½	6 0	
Do. ⅞ × 6½	5 0	
Do. ⅞ × 6½	5 6	

AUSTRALIAN TIMBER.—The Jarrah timber of Western Australia, also called mahogany, is about to be cut on a large scale by a new company. The timber is valuable for sleepers, posts, piles, shipbuilding, dock gates, and other purposes.

LATEST PRICES OF MATERIALS USED IN CONSTRUCTION.

TIMBER.

	£ s.	£ s.
Teak.....load	12 10	13 0
Quebec, red pine	3 15	4 15
„ yellow pine..	4 0	5 0
St. John, N.B. yellow	0 0	0 0
Quebec oak	5 15	6 5
„ birch	3 15	5 0
„ elm	4 5	5 5
Dantzic oak	4 5	6 5
„ fir	2 5	4 5
Memel fir.....	2 5	3 15
Riga	2 15	3 2
Swedish	2 0	2 13
Masts, Queb. red pine	3 10	5 10
„ yellow pine ..	3 10	5 10
Lathwood, Dant. fm.	4 0	5 10
„ St P'burg.	5 5	6 5
Deals, pr C., 12ft by 3 by 9 in.		
Quebec, white spruce	12 0	17 0
St. John, white spruce	12 10	15 0
Yellow pine, per reduced C.		
Canada, 1st quality..	18 0	19 0
2nd do.....	12 0	13 0
Archangel, yellow ..	11 0	12 0
St. Petersburg, yel...	11 0	12 0
Finland	6 10	8 0
Memel	7 0	9 0
Gothenburg, yellow	8 0	9 0
„ white ..	0 0	0 0
Gefle, yellow	9 0	10 16
Soderham	8 0	9 10
Christiania, per C., 12 ft. by 3 by 9 in yellow	10 0	12 10
Flooring Boards, per sq. of lin., first yel.	7 6	10 6
First white.....	7 0	9 6
Second qualities	6 0	7 0
PUMICESTONE pr tn	6 0	8 0
OILS, &c.		
Seal, pale .. per tun	40 0	0 0
Sperm body.....	90 0	0 0
Cod.....	41 0	0 0
Whale, Sth Sea, pale	37 10	0 0
Olive, Gallipoli.....	54 0	0 0
Cocoanut, Cochin, tun	45 0	0 0
Palm, fine	39 10	0 0
Linseed.....	32 0	0 0
Rapeseed, Eng. pale..	45 10	46 0
Cottonseed	31 0	36 5

METALS.

LEAD:—

Pig, Foreign .....per ton	17	12	6	17	15	0
„ English, W.B. ..... do.	19	5	0	19	7	6
„ Lead Co. ..... do.	18	12	6	18	15	0
„ Other brands ..... do.	18	0	0	18	5	0
Sheet Milled ..... do.	0	0	0	0	0	0
Shot, Patent ..... do.	21	0	0	0	0	0
Red or minium ..... do.	19	15	0	20	0	0
Litharge, WB ..... do.	0	0	0	0	0	0
White dr7 ..... do.	25	10	0	30	0	0
„ ground in oil ..... do.	0	0	0	0	0	0

COPPER:—

British—cake and ingot .....per ton	70	10	0	71	0	0
Best Selected..... do.	72	0	0	0	0	0
Sheet ..... do.	74	10	0	76	0	0
Bottoms ..... do.	78	0	0	0	0	0
Australian..... do.	73	0	0	75	0	0
Spanish Cake	0	0	0	0	0	0
Chili Bars ..... cash	67	0	0	68	0	0
„ refined ingot	70	0	0	72	10	0
eL Metal Sheathing & Rods .....per lb.	0	0	6½	0	0	6½

MEETINGS FOR THE ENSUING WEEK.

THURSDAY.—Society for the Encouragement of the Fine Arts. Exhibition of engravings and etchings. Also paper by J. Saddler, Esq. 8.
„ Linnæan Society. 8.
„ Society of Antiquaries. 8.30.

Trade News.

TENDERS.

BERKS.—For making certain alterations and additions to Huntercombe House, near Maidenhead, Berks. C. E. Davis, Esq., F.S.A., architect. Quantities supplied by Mr. G. W. Ranwell, 3, Westminster Chambers:—

Silver and Son	£1540 0
Webb	1475 0
Reavell	1400 0
Almond and Webb	1372 0
Woodbridge	1370 0
Nightingale	1328 0
Taylor	1246 7
Gibson, Bros. (accepted)	1234 0

BERKS.—For the erection of seed stores, Reading, for Messrs. Sutton and Sons. Messrs. W. J. T. Brown, architects. Quantities supplied:—

Dunn	£710 0
Wheeler, Bros.	700 0
Sheppard	697 0
Strong	690 0
Burnicoal	685 0
Woodroffe (accepted)	677 10

DRIFFIELD, YORKSHIRE.—For painter's work required at the Union Workhouse, Driffield. Mr. J. F. Shepherdson, surveyor:—

Hall	£127 17
Ward	125 0
Wilson (accepted)	125 0
Limewashing at Do.	
Dry	£26 0
Clark	25 0
Berry (accepted)	17 15

KILBURN.—For new schools for the district of S. Mary. Mr. William Smith, architect:—

Brown	£1494
Foxley	1366
Yerbury	1307
Patman and Fotheringham	1298
Keyes and Head	1282
Sawyer	1244
Newman and Mann	1216
Manley and Rogers (accepted)	1157

HAMMERSMITH.—For a pair of semi-detached villas for Dr. Hirschfield. Mr. W. K. Knapp, architect:—

Capps and Ritso (accepted)	£2100

KENSINGTON.—For house and shop, High-street, for Mr. Joseph Toms. Mr. John Cox, architect. Quantities supplied by Mr. Sidney Young:—

Hockly	£1840
Roberts	4760
Conder	4517
Manley and Rogers	4396
Scrivener and White	4268
Cooke and Green	4267
Longmire and Burge	4255
Goodman	4195

PETERBOROUGH.—For S. Paul's Vicarage House. Mr. Edward Browning, architect:—

	House.	Stables, &c.	Total.
Perkins and Sons	£1407 0	£110	£1517 0
Richardson and Roberts	1343 0	104	1447 0
Halliday and Cave	1320 0	103	1423 0
Hobson and Taylor	1227 0	100	1397 0
Thompson (accepted)	1287 10	106	1393 10

SEVENOAKS.—For the erection of a house and stables for A. Wilson, Esq. Mr. J. M. Hooker, architect. Quantities supplied:—

	House.	Stables.	Total.
Myers and Sons	£3176	£254	£3430
Hart	2600	195	2795
Dove	2595	185	2780
Dove, Bros.	2565	195	2760
Wallis and Clements	2550	200	2750
Sharpington and Cole	2533	200	2733
Henshaw	2543	185	2728
Jackson and Shaw	2522	198	2720
Longmire and Burge	2511	194	2705
Anscomb	2448	190	2638
Turner and Sons	2387	205	2592

SEVENOAKS.—For erecting a house for — Lyall, Esq. Mr. J. M. Hooker, architect. Quantities supplied:—

J. S. Anscomb (accepted)	£2655

CONTRACTS OPEN FOR BUILDING ESTIMATES.

BRADFORD, June 13.—For the erection of a new town hall. W. T. McGowen, Town Clerk, Corporation Offices, Bradford.

FALMOUTH.—UNITED DISTRICT SEWERAGE WORKS, June 21.—Contract No. 1.—For providing and laying about 5000 yards of best glazed stoneware socket pipe sewers, from 9in. to 12in. in diameter; also the necessary junctions, cleansing pipes, syphons, sand tanks, gulleys, sewer ventilators, &c. Contract No. 2.—Providing and laying about 2500 yards of best glazed stoneware socket pipe sewers, from 9in. to 21in. in diameter; also the necessary junctions, cleansing pipes, syphons, sand tanks, gulleys, sewer ventilators, &c.—Wm. Warn, Clerk, Falmouth United District Sewerage Board Office.

MAIDSTONE, June 13.—For the erection of offices for the Clerk of the Peace, near the Courts of Justice. F. Russell, Clerk of the Peace, Maidstone.

GREENWICH DISTRICT, June 15.—For constructing and maintaining in repair, for eighteen calendar months, the several additional lengths of brick and pipe sewers, and other works. E. W. James, Clerk to the Board, Greenwich.

WAKEFIELD, June 18.—For building chapel and completing the south wing, and other works, to the House of Mercy, at Horbury, near Wakefield. Rev. John Sharp, the Vicarage, Horbury, Wakefield.

NEWCASTLE-UPON-TYNE, June 20.—For the erection of new schools in Bath-lane, Newcastle-upon-Tyne. Thomas Oliver, F.R.I.B.A., architect, Newcastle-upon-Tyne.

NEWCASTLE-UPON-TYNE, June 15.—For the erection of a new U.P. church in Westmoreland-road, Newcastle-upon-Tyne. Thomas Oliver, F.R.I.B.A., architect.

CROYDON, June 21.—For enlarging the church of St. Andrew. Rev. D. Long, St. Andrew's Vicarage, Croydon.

ROCHESTER, June 27.—For the erection of a new corn exchange at the city of Rochester, on a piece of ground in the rear of and adjoining to the present Corn Exchange. Richd. Prall, Town Clerk, Rochester.

WIGAN NEW INFIRMARY, July 1.—For the erection of the proposed new infirmary for Wigan and the district. Richard Lea, hon. sec., Wigan.

MANCHESTER, June 16.—For the erection of a wall to separate their estates at Crumpsell from that belonging to the Guardians of the Prestwich Union. John Harrop, clerk to the Guardians, Poor Law Office, Bridge-street.

HUDDERSFIELD, June 30.—For the erection of a first portion of a block of buildings comprising shops, warehouses, &c., for Sir J. W. Ramsden, Bart. W. H. Crossland, F.R.I.B.A., 25, Park-square, Leeds, and 4, Regent-street, S.W.

DUBLIN PORT AND DOCKS BOARD, June 29.—For taking up and rebuilding a portion of the north wall quay, for a length of about 1832ft., with works connected therewith. N. Proud, Secretary, Dublin Port and Docks Office.

BRANDON, June 14.—For the erection of a detached villa residence, Brandon, Suffolk, for Mr. W. Rough, Brandon, to whom apply.

FULHAM UNION, June 15.—For the supply of fifty fathoms of the best yellow deal ends and one hundred fathoms of yellow boards, not less than 1¼ inch thick, suitable for cutting into fire-wood. T. Aplin Marsh, Clerk to the Guardians, Clerk's Office, Fulham Union Workhouse, Hammersmith, W.

METROPOLITAN BOARD OF WORKS, June 27.—For the erection of a fire brigade station in Ladbroke-road, Nottinghill. John Pollard, Clerk of the Board, Spring-gardens, S.W.

BRISTOL LOCAL BOARD OF HEALTH, June 21.—For constructing, with cast-iron railings, cantilevers and mouldings, a wrought-iron girder bridge, at or near Park-street, Bristol. John G. Heaven, clerk.

LEEDS, June 11.—For the erection of a shop and offices, lot 8, Boar-lane. William Bakewell, architect, Leeds and Halifax.

LEEDS, June 11.—For the erection of a shop and offices lot 6, Boar-lane. William Bakewell, architect, Leeds and Halifax.

CAWOOD, NEAR SELBY, June 21.—For the forming of a footpath, about 800 yards in length. W. H. Nicholson, and Thomas Thomlinson, Surveyors, Cawood.

FULHAM UNION, June 15.—For the supply of 3,000 tons of Guernsey granite spalls. T. Aplin Marsh, Clerk to the Guardians, Clerk's Office, Fulham Union Workhouse, Hammersmith, W.

COAST-GUARD CONTRACT, June 18.—For the erection of a coast-guard station. at Kessingland, Suffolk. Director of Works Department, Admiralty, Spring Gardens-terrace, London, S.W.

CHESTER, June 18.—For the proposed alterations and repairs to the roof of the public market, Northgate-street. John Walker, Town Clerk, Town Hall.

LEEDS, June 30.—For the erection of two villa residences. Ridley King, architects, 24, Park-square, Leeds.

LEEDS. June 20.—For the erection of six good houses, in Virginia-road, Mount Preston. Wilson and Bailey, architects, Central Market-buildings, Leeds.

LEEDS, June 25.—For the erection of a dwelling house in Bellevue-road. Wm. Wilks, architect, 9, East Parade, Leeds.

MALDON, June 20.—For the erection of a new bridge (to be built principally of brick) over Heybridge Creek of the river Blackwater, at Maldon, Essex. G. W. Digby, Town Clerk, Maldon.

NEWARD, June 15.—For the construction of a gasholder tank, at the gasworks. C. C. Foottit, Clerk to the Company, Newark.

BATH STONE OF BEST QUALITY.

RANDELL, SAUNDERS, and COMPANY, LIMITED, Quarrymen and Stone Merchants, Bath. List of Prices at the Quarries and Depôts; also Cost for Transit to any part of the United Kingdom, furnished on application to

BATH STONE OFFICE,
[ADVT.] Corsham, Wilts.

BANKRUPTS.

TO SURRENDER IN THE COUNTRY.

George Frederick Hooker, Marlowes, Hertfordshire, builder, June 11, at 11.—George Tasker, Teignmouth, June 14, at 1.—John Jameson and M'Cormick, James Steele, Wigan and Hull, contractors, June 22, at 12.—Liberty Taylor, Tunbridge-wells, plumber, June 20, at 3.

DIVIDEND MEETINGS.

W. Stebbing, Watton, bricklayer, June 27.—J. and C. Todd, Milner-street, Brompton, builders, June 25.—E. Shaw, Huddersfield, plumber, June 22.—C. Schofield, Lindley, Yorkshire, carpenter, June 22.—G. Porter, Hillhouse, near Huddersfield, builder, June 22.

ACT 1869.—PUBLIC EXAMINATIONS.

W. C. Elliott, Plymouth, builder, June 14.—J. Storry, Southtown, Suffolk, carpenter, June 22.—W. Cawood, Scarborough, builder, June 15.

PARTNERSHIPS DISSOLVED.

Reid and M'Cartney, Manchester, bricklayers. —Saunders and Callaway, Bristol, timber and general merchants.—Riley, Hargreaves, and Co.. Oldham, brass founders.—W. Hudson and G. Chaffer, Birmingham, ironfounders —R. H. Gayforth, and T. Walmsley, Manningham, builders.—D. Hopwood, and W. Fielden, Bolton, cement manufacturers.—Nicholson Brothers, Tong Benton, Northumberland, quarrymen.—M. Wheatley and Co., Newcastle-upon-Tyne, iron merchants.

SCOTCH SEQUESTRATION.

William Henderson, Glasgow, builder, June 14, at 12.—James Duffes, Inverness, plasterer, June 15 at 12.

Important Freehold Building Site, within a few yards of the intended additions to the National Gallery Trafalgar-square, Charing-cross, comprising 8000 superficial feet, with immediate possession; also the Freehold Public-house adjoining, known as the Monmouth Head, situate at the corner of Castle-street and Hemmings-row.

Messrs. Rushworth, Abbott, and Co. beg to announce that they have instructions to SELL the above mentioned valuable FREEHOLD PROPERTY. The houses erected on the ground are numbered 34, 35, and 41, Castle-street, in the rear of which is a large yard, with stabling and other buildings, immediate possession of the whole of which will be given, affording a most desirable opportunity for the erection of a public building, picture galleries, a museum, theatre, mercantile establishment, &c., being situate within 150 yards of Trafalgar-square, and in the centre of the metropolis. The Monmouth Head public-house, No. 17, Hemmings-row, is let on lease till 1909, and will form a separate lot. Plans of the whole estate may now be inspected, and further particulars obtained at the offices of Messrs. Rushworth, Abbott, and Co., 22, Savile-row, Regent-street, W., and 19, Change-alley, Cornhill, E.C., who are fully authorised to negotiate a Sale by Private Treaty.

Crystal Palace Company.—To Builders and others.—Crystal Palace Estate.—The Crystal Palace Company are prepared to let on building leases for a term of 99 years, certain portions of their freehold property abutting upon the Penge-road, Thickwood-road, Anerley-road, and Palace-road. Plans and conditions may be seen on application to John Norton, Esq., Architect, 24, Old Bond-street, W., or to Mr. Hart, Accountant, Crystal Palace, Sydenham, S.E

A Capital Brickfield to be Let, 17 miles east of London, having railway sidings and a large wharf. Plenty of excellent brick and tile earth, also fine sand and abundance of water. Fixed rent and royalty moderate. Immediate possession. No stock nor plant to be taken. For particulars apply to Messrs. Burder and Dunning, 27, Parliament-street, Westminster. S.W.

Building Land, with Mansion and Stabling, at Acton, Middlesex, known as "The Friars," the property of the Goldsmiths' Company, and containing 13 acres, is to be LET, for 99 years, for the Erection of Detached Residences. It is a quarter of a mile from the Acton Station, whence there is communication with the City and West-end by the Metropolitan Railway. It is the highest land in Acton, well timbered, and having a fine prospect over the Surrey Hills southwards, and over London, Middlesex, &c. Apply, personally, at the office of Mr. Hesketh, London Assurance, No. 7, Royal Exchange, London E.C.

IMPROVED DWELLINGS FOR THE PEOPLE.

THE ARTIZANS', LABOURERS', and GENERAL DWELLINGS COMPANY (Limited).

Capital £250,000. Shares £10. £1 paid per Share.

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Right Hon. Earl Shaftesbury.	Thos. Bazley, Esq., M.P.
Right Hon. Earl Lichfield.	Jacob Bright, Esq., M.P.
Lord Elcho, M.P.	John Cheetham, Esq., M.P.
&c., &c., &c.	W. R. Callender, jun., Esq., M.P.

W. SWINDLEHURST, Manager and Secretary.

The Company is especially formed to erect improved workmen's dwellings on the co-operative principle. No beershop or tavern to be erected on the Company's property. Profits realised by workmen employed on the buildings 40 per cent. Deposits received at 5 per cent. Prospectuses on application, enclosing postage stamp. Office 1, Great College-street (opposite the House of Lords), Westminster, London.

Sovereign Life Office, 48, St. James's-street, and 110, Cannon-street, London. New Policies were issued in 1869 for £311,250, at an average of £680 each. The Life and Annuity Funds connected with the Office exceed £600,000. Advances are made on Freeholds, &c.; also, to a limited extent, on first-class Personal Security.

H. D. DAVENPORT, Secretary.

Half a Million has been Paid by the RAILWAY PASSENGERS' ASSURANCE COMPANY, as COMPENSATION for ACCIDENTS of all kinds (riding, driving walking, hunting, &c.)

An Annual Payment of £3 to £6 5s. insures £1000 at Death, and an Allowance at the rate of £6 per week for Injury.

A BONUS TO ALL POLICY HOLDERS OF FIVE YEARS' STANDING HAS BEEN DECARED, PAYABLE IN AND AFTER 1871.

For particulars apply to the Clerks at the Railway Stations, the Local Agents, or at the Offices,

64, CORNHILL, and 10, REGENT-STREET, LONDON.

WILLIAM J. VIAN, Secretary.

Just Published, 64mo, roan, price One Shilling.

Spons' Tables and Memoranda for Engineers, Selected and Arranged by J. T HURST.

London: E. and F. N. SPON, 48, Charing-cross.

This work is printed in pearl type, and is so small, measuring only 2¼in. × 2in. by ¼in. thick, that it may easily be carried in the waistcoat pocket.

Architectural Books.—A New Catalogue of English and Foreign Books on Architecture, Building, Ornament, the Fine Arts, etc., forwarded gratis and post free to all parts on application to BRADLEY THOMAS BATSFORD, Architectural and Engineering Bookseller, 52, High Holborn, London, W.C.

To Builders, Contractors, and Others.—To be SOLD, several most substantially built 10 ROOMED CARCASSES, some partially finished, drained into the main High Level sewer, situate near the new church of S. George's, in the Tufnell Park-road, Holloway, a wide road leading out of the main Holloway-road, near the Nag's Head and close to the Favorite Omnibus Route. Apply to Messrs. Dalton and Jessett, solicitors, St. Clement's House, St. Clement's-lane, Lombard-street.

Dry Wainscot, 3 years old, price 6d. to 9d. Mahogany equally cheap, at JOHN COUMBE'S Lady Lake's Grove, Mile-end Gate.

Extensive Wharfage to Let at Chelsea.—River Frontage about 600ft. Also fine Wharfage in the Canal adjoining the West London Railway Goods and Coal Depot, all possessing great facilities for Merchants, Contractors, &c., and may be had on lease in parcels, or offers for the whole be entertained.—For terms, apply to Ashburnham Estate Office, Cremorne-road, Chelsea.

To Contractors, Builders, and Others.—Dry Brick Rubbish can be received at the extensive Wharfage forming a portion of the Ashburnham Estate, Chelsea.—For terms, apply to Estate Office, Cremorne-road, Chelsea.

To Let.—To Builders.—A most eligible Plot of Land, a part of the Ashburnham Estate, having about 240 feet frontage in King's-road, opposite St. Mark's College and the New Streets. The Plot of Ground is enclosed in a Ring Fence 8 feet high, and there is a Workshop of large dimensions, with General Office, well built, and lighted with sashes and skylights. The whole affords every facility for builders. The terms and ground-rents are low. It is within a short distance of Chelsea Station on the West London Railway, and easy of access to Steam Boats. Omnibuses pass within two minutes' walk every ten minutes. For terms, apply to the office, Ashburnham Estate, Chelsea.

To be Disposed of, Decorating Business, with Paperhanging Warehouse, in the neighbourhood of Pimlico. Is well established. Stock and goodwill about £200.—Apply at 234, High Holborn.

Kew. — Important Building Estate. The Cumberland Estate, adjoining the Royal Gardens, and close to the Kew Gardens Station, with new roads formed through the estate, offering choice Building Sites, TO BE LET, on Building Leases, direct from the Freeholder, at moderate ground rents. The soil is loam, with a subsoil of sand and gravel, and the climate is proverbially healthy. Water is laid on. By the new railway in connexion with the Metropolitan system, Kew is now readily accessible from all parts of the metropolis. Money will be advanced. Plans and particulars may be had of Messrs. DRIVER, Surveyors, Land Agents, and Auctioneers, 4, Whitehall, London, S.W.

Royal Polytechnic.—"Sand and the Suez Canal," by Professor Pepper.—Musical Entertainment, by George Buckland, Esq., "The Heart of Stone," with Spectral Scenes. American Organ daily. Dugwar's Feats and other attractions, all for One Shilling. "The Great City" at half-past 1. Suez Canal, at half-past 2 and a quarter to 8. Heart of Stone, at 4 and 9. Dugwar's Feats, at half-past 3 and quarter past 7. Open 12 to 5 and 7 to 10.

UNDER THE PATRONAGE OF H.M. THE QUEEN.

THE LONDON PARQUETRY WORKS, the first Manufactory established in England (in 1841) by CHARLES STEINITZ, founder of the English Parquetry Business, for the exclusive production of

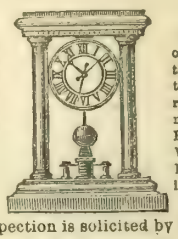
"Solid and Plated" Parquet Floors Borders, Ceilings and Wall Decoration.

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Plans and Estimates, for First-class Work only, prepared free of expense. Manufactory—Camberwell Hall, Grove-lane, Camberwell S.E. Sole Agents and Show Room, Gillow and Co., 176 and 177 Oxford-street, W.

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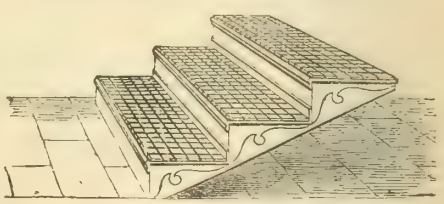
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THE BUILDING NEWS.

LONDON, FRIDAY, JUNE 17, 1870.

HISTORICAL PHOTOGRAPHS ILLUSTRATIVE OF THE ARCHÆOLOGY OF ROME.

MR. JOHN HENRY PARKER, who is the life and soul of the society formed for the investigation of the antiquities of Rome, has done a good work in collecting and exhibiting in Cundall's Gallery, in Bond-street, the fifteen hundred photographs which are a very tangible result of his labour of love in that city. The original intention with which they were taken, he says, was to illustrate his work on the Antiquities of Rome, and to enable persons who have not had the opportunity of visiting the spot to follow the arguments he has advanced therein. Mr. Parker, whom delicate health has compelled for some years to winter in Italy, with characteristic energy improved these opportunities by turning his attention to the numerous interesting archæological questions which force themselves upon the minds of intelligent visitors to the Holy City. In doing so, he found that the published guides and books which treated of these subjects had been generally copied one from the other, and that the received authorities were not to be depended upon, and he resolutely set to work to correct their errors and supply their deficiencies.

The Herculean nature of this self-imposed task must be evident to every one who enters the gallery in Bond-street; for though it is comparatively easy now to follow him in consequence of the able manner in which this multitude of photographs has been arranged, the mind almost refuses even to attempt to realise the time and patience which he must have devoted in order to direct the operations of the photographer, not to speak of excavators and labourers, in positions which might be thought inaccessible for such a purpose. By the aid of the magnesium light, the deepest recesses of the catacombs have been made to reveal the faintest traces of the decoration of their pavements, walls and ceilings, and these works of the persecuted Early Christians have been thus brought to light, as well as the more sumptuous architecture of their persecutors.

The theory which Mr. Parker started with the hope of elucidating—and it needs a theory as a basis for such an enterprise—was that the City of Rome was built upon the great earthworks, the scarped cliffs, the terraces and trenches of the primitive fortifications, and that these have governed more or less the subsequent plan of the City and influenced the choice of the sites of the principal buildings. As soon as this idea was realised, and proved to have a good foundation, it disposed of the popular fallacy that the soil of the whole city has, during the long lapse of time, been raised to an extraordinary extent. This erroneous notion had arisen from the occasional great depth of rubbish and *débris* which naturally accumulated in and filled up the ancient trenches.

Mr. Parker acknowledges the zealous assistance of several young Roman Princes, who, at their own expense, have made good search for these early traces, and the work thus set on foot has been very successful. Of course the primitive fortifications have become much obliterated, but the wall of Servius Tullius has been discovered in several places, and in particular one ancient fossway, with its pavement sunk twenty feet under accumulations of rubbish, has been traced along the inner side of the Great Agger. Again, the Great Wall of Aurelian, which was thirteen miles long and fifty feet high, with a corridor for the sentinels inside it, has been examined, and is copiously illustrated by photographs.

The aqueducts seem to have been very thoroughly worked out, and around the room are many careful plans and sections explanatory of the photographs; and the architectural student will do well to study these, as the minutest details of these wondrous structures are to be found in them. Mr. Parker justly claims to have paid particular attention to their *construction*, and says that he has "endeavoured to show them in the photographs in order to make them tell their own history to those who have learned to read the stones."

The types of the character of work of each half century, from the time of the foundation of Rome to the sixteenth century, are shown by the arrangement of the photographs in a consecutive chronological series, and thus a ready clue is afforded to the archæological student which cannot fail to be of the greatest use. In these the remains of the great buildings of the empire—the temples, palaces, thermæ, basilicæ, theatres, amphitheatres, triumphal arches, &c.—are shown as they exist at the present day sufficiently to carry out the above named excellent plan, but as they are of course the stock subjects of the Roman photographers, it has been to less hackneyed subjects that the greatest attention has been given. To our mind the most interesting of the whole collection are those which represent the fresco paintings in the catacombs and the mosaic pictures in the churches. Independent of their undying interest and the associations they evoke, they present valuable suggestions for architectural decoration, and many which would prove of use to our own ecclesiastical architects. The middle ages were not the period in which Rome excelled in the arts, but this series of photographs is not without specimens of interest of that time; but of the rich church furniture, &c., of later centuries there is a large number of photographs, as also of the contents of the Roman museums, such as the busts of the emperors, sculptured sarcophagi, coins, &c., &c.

As specimens of the photographic art there is much left to be desired, but the extraordinary difficulties in numerous cases of taking any such views at all should be taken into account, and on the whole we feel that we may heartily congratulate Mr. Parker upon what he has achieved.

We ought to remark that though much has been done, there is much left to do, and that other nations are in the field to contend for the honours of which Mr. Parker has reaped so good a share. The fund for prosecuting these interesting inquiries, of which he is treasurer, is becoming low, and he seeks for pecuniary aid, which we trust will be liberally afforded to the Society. We call therefore the especial consideration of our readers to the following paragraph, which concludes the preface to the catalogue of these Historical Photographs:—

The Municipality of Rome has undertaken to carry on the excavations of the Mamertine Prison which we commenced last year. The Pontifical Government has undertaken to open a new gate by the side of the Porta S. Lorenzo, and excavate the old gate, to show the difference of level between the gates of Augustus and those of Honorius, A.D. 400, and to show also the arcade of the Aqueduct. It will also carry on the great works at the Marmorata and at Ostia. The Roman Princes will go on with their works. The Emperor of the French will continue to expend a large sum on the Palatine, as he has done with much spirit for several years past. The Prussians will carry on their useful archæological establishment, and will probably make some other excavations, as they did last year at the College of the Arvales. Shall the British race be the only one to do nothing in this interesting field?

EXHIBITION OF MICHAEL ANGELO AND RAPHAEL DRAWINGS AT THE BURLINGTON FINE ARTS CLUB.

IT has always been an undecided question whether genius be a direct inspiration or the result of a steady and laborious application of those particular talents which are confided to many on their entrance into the world. A careful study of the drawings of two such great men as Michael Angelo and Raphael here exhibited entitles us at least to an opinion upon this much-vexed subject, and we are inclined to think that to a direct inspiration alone do we owe those exquisitely-beautiful and noble drawings which convey to us the first dawn on paper of a subject in these great painters' minds, while the care which they took (Raphael especially) in developing and making studies to enrich this first thought deserves the attentive consideration of all true lovers of art. For here a man with an educated eye may see the entire method of working pursued by these great artists. Take, for instance, the interesting set of sketches by Raphael for a portion of a group in the Borghese Entombment (Nos. 23 and 26), and the Windsor drawing of the same subject. There is first the thought and study of the different heads; then the pose of the fainting figure, which pose the painter very probably may have seen in life; then the endeavour to get the action quite correct by putting in the skeleton within his own drawing of the pose (observe that he is only careful in the skeleton drawing of those parts which the drapery does not hide); secondly, the very fine drawing of the group itself, No. 26, most probably the first idea; and, lastly, the traced drawing slightly altered in the putting together belonging to the Windsor collection, which has been most unfortunately placed apart from the others on the screen. M. Angelo was accustomed to use the skeleton in his work. The careful little wax models of the skeleton and muscles, studies for his grand statue of David, part of the Gherardini collection, now in the South Kensington Museum, are well known, and probably he induced Raphael to follow his example, for his method of work must have been somewhat founded on that of his elder brothers in art. Raphael's fine power of completing a drawing is shown in the finished study for the "Vierge au Berceau," though we doubt if it is all by his hand; certainly the Virgin is much altered in the completed work in the Louvre. The head of S. John in this drawing has been used by the painter in more than one of his pictures. No. 37, S. Agatha, belonging to Mr. W. Mitchell, is a very beautiful study of a very graceful figure, probably drawn from life; the drapery, too, is excellent. How noble this painter's first thoughts were may be seen in No. 27, a *fac-simile* of a drawing in the Louvre, in which the lovely weeping figure of S. John on the left deserves especial attention. There is intense feeling, too, in No. 7—a youthful head drawn with a silver point, belonging to Mr. Malcolm. No. 87 (the property of Mr. Mitchell) contains two careful drawings from the nude, excellent for showing Raphael's mode of study—how little he did, and how much he got by that little. Contrast No. 87 with No. 1, where, in the most rapid manner, he has taken advantage of the life to seize an attitude. Compare it, too, with No. 13—three male figures for one of the compositions of the Bible, admirably and rapidly sketched from nature, but in a grand manner and with fine proportions. In fact, Raphael is always truly great from his very smallest sketch, such as No. 93, a reproduction of a drawing belonging to Mr. Salting, to No. 2, the grand finished study of the Archangel Michael and Satan. The painter here has finely rendered the superhuman power of Michael, who has known no struggle with the fallen demon. The drawing by Michael Angelo, of the Holy Family, executed in black chalk, from the Windsor collection, is very large in manner, and finely conceived; the drapery is simply cast, and there is not a superfluous detail given in the whole work. There are also some grand ideal heads, by this great master, exhibited here, and some curious specimens of his hand writing. We must leave our readers to decide for themselves on the originality or non-originality of the "Cleopatra;" that it is certainly painted with an oil medium is rather against it. There is wonderful energy in this

painter's drawing of the Labours of Hercules, in the Queen's collection. How he has got Cacus into his grasp! The extraordinary action also in the groups from the Elysian fields driving home their arrows and almost following them into the mark, could only have proceeded from the hand of this great genius. Mr. Vaughan's three fine drawings, one from the cartoon at Pisa, one for the Isaiah, and the third for Sybilla Erethrea, are remarkable as showing M. Angelo's rapidity of execution, and his manner of studying the drapery of his prophets. In conclusion we must remark that there are some drawings in the Malcolm collection we cannot believe in, though there are several of very great excellence. Many good photographs from the works of M. Angelo and Raphael, which we have not time to notice, adorn the walls of the Burlington Club. They are interesting as showing how cheaply the public may now be educated with the appreciation of what is truly good and great in art, and we owe our thanks to the Club for the treat they have provided their friends, for the collection, though much smaller than we had imagined, is of much artistic value.

THE ARCHITECTURAL SKETCHES AT THE CONDUIT-STREET EXHIBITION.

THE west gallery at the Architectural Exhibition in Conduit-street is devoted to architectural sketches. We use the term sketches, as but few of them could claim the higher title of drawings—that is, of careful and finished works. Of such, however, there are some, and we may specify in particular those which have been drawn by Mr. Edward Sharpe, and coloured by Mr. Brewer. No. 353, an interior view of the Lady Chapel at Tournay Cathedral, and No. 355, that of S. Giles' Church, Brunswick, are beautiful and accurate drawings, and the manner in which the painted glass is represented is exceedingly good. The exterior views, No. 352, of S. Andrew's Church, and 354, S. Catherine's, both at Brunswick, are not quite equal in merit, but yet are striking. Mr. Sharpe is also a liberal contributor of drawings of his own in pen and ink, all of which are accurate and careful. Mr. Ernest Lee and Mr. H. W. Lonsdale seem to have worked together in a good field—that of the sculpture of the Cathedrals of Amiens and Chartres. They send pencil sketches of considerable merit of the well-known bas relief from the portals, representing the signs of the zodiac, the labours of the months, &c. It is difficult to distinguish between these works in point of merit. We noticed a lion, by Mr. Lee, admirably drawn, but generally Mr. Lonsdale's touch seems the firmer of the two. Mr. Thomas Blackhill sends numerous sketches of a far too careless nature, and we fear we must point to them only as being of a class to be regretted, as they show an endeavour to make pretty sketches, irrespective of truth and economical of labour.

Mr. T H. Watson sends two frames full of slight sketches of mediæval embroidery, Nos. 244 and 245, mere shorthand notes of interesting material, of value mainly to himself. Mr. Lonsdale's sketches of draperies from manuscripts, No. 310, are of a far more finished and therefore useful character to others, and we incline to think to himself as well, as the very effort and care bestowed upon them must have brought a reward.

Mr. Phene Spiers sends several of his picturesque sketches that almost, but not quite, deserve the name of architectural drawings. Among the best is No. 343, Hypœthral Temple, Philæ, and perhaps his worst is No. 356, Temple of the Sun, Baalbec.

No. 264, a noble drawing of a Castle in Normandy, bears the name of J. S. Cotman. It is fine in style, rich in colour, and broad in effect. Hardly less so are No. 311, Interior of North Aisle of Choir of Norwich Cathedral, and No. 314, Old Manor House, Finchary, sent in the same name.

Mr. Batterbury has some faint but careful pencil drawings, as No. 232, Chateau de Tremouille, and No. 252, S. Nicholas, Caen, and Seez Cathedral.

Mr. Edward I'Anson has a fine series of drawings well worth examination. They are sketches taken at Athens in 1836, Nos. 266 to 276 inclusive. Some are in colour, and some in pen and ink, touched up with the brush. On the whole, they are delicate, as suited to Classic subjects, but hardly sufficiently so at times, as in the sculpture shown in No. 274, the Horologium of Andronicus Cyrrhestes, and north side of Acropolis.

Mr. Emerson has also sent a series of drawings of a very different character. They are powerful in colour, and, in fact, are sometimes mere studies of colour, as No. 285, Interior of S. Mark's Church, Venice, where he has caught well the peculiar coppery hue of the gilt ground of the mosaic decorations. Perhaps Mr. Emerson's best drawing is No. 288, Hindoo Columns, Bejapore, where the details are put in in a masterly manner. 295, Hassan Mosque, Cairo, is also a fine drawing, in which the delicate gradations of tint in the marble panels are well represented.

Mr. Thomas Vaughan sends 321, a large frame full of minute and careful pen-and-ink drawings, from sketches of Ambones, rostra, and pulpits.

Mr. J. C. Wilberfoss also contributes two good and elaborate, almost too elaborate, pen-and-ink drawings—No. 315, Interior, Wintringham Church, East Yorkshire, and No. 336, Interior of Ancient Hall, Hadfield. Mr. H. M. Marshall has a good coloured sketch, No. 344, Apse of the Friar, Venice; and Mr. Richard Groves another—No. 361, View in Aisle of Cathedral, Sienna.

Included among the sketches in this west gallery, rather than among the drawings for decoration in the larger one, in consequence of having been sent late, are some remarkable designs for wall painting in Newland Church, Nos. 381 to 387 inclusive. The general treatment and the scheme for the various subjects are admirable. The colours are subdued. Above the dado, which is of chocolate, divided as into masonry by white lines, &c., the ground is generally pale as of untouched plaster, or perhaps even unplastered light brickwork, as at Mr. Pearson's new church in Vauxhall. The figures are simply outlined and thrown out by diapered and tinted curtains, &c. One series of subjects are divided by borders as framework into rectangular compartments above the dado, and below the springing line of the window, and another and more continuous range of subjects is carried along the upper part of the walls. Were their decorations carried out with a higher type of art-work than we fear is suggested by these drawings, we should have great cause for rejoicing, but we cannot help noticing with regret the same appearance of the personages represented being afflicted with water on the brain, or studied from the blocks in barber's shops, which is the general type of church decorative work of the day. Not knowing even where Newland is, we cannot say whether the actual work is or is not free from such character, but we can heartily say that the general scheme and design is worthy of being carried out in the best manner possible.

LATTICE PIERS.

THE introduction of the open web or lattice sides to an iron bridge in place of the solid plate adopted in the early specimens of those structures which were intended for the purposes of railway traffic, was regarded by many engineers as an experiment of a doubtful nature. Several eminent professional men, who it might be reasonably imagined would have investigated the question more deeply before they ventured on a condemnation of its merits, rejected the whole principle, and, it is needless to remark, never designed any bridges based upon it. But the light of science was beginning to dawn upon the profession. Theory and education were about to be substituted for empiricism and ignorance, and the days of rule-of-thumb were drawing fast to a close. The rejection of the open-webbed girder at its first introduction was a proof of two things. One was that very few engineers knew anything about the science of it, and the other that very many were incapable of acquiring that knowledge. Some short time subsequently, mathematicians and engineers of education and scientific attainments took up the subject, investigated it throughout all its details, were convinced of the soundness of the principle, and ultimately experience and practice confirmed, as they always do, the dictates of true theory. To merely substitute an open lattice side for a solid plate one is the easiest thing in the world, but to accomplish this in a manner that shall fulfil the conditions of a correct distribution of the strains, and consequently of a minimum of material, requires an amount of theoretical knowledge and practical acquaintance with the construction of ironwork which is not acquired without a good deal of hard work and careful study. It cannot be too attentively kept in view that it is in the web of the lattice girder that the superior economy of the whole structure consists when comparing it with the solid plate type. It possesses no advantages so far as the flanges are concerned, which in both instances are nearly identical in form and sectional area. In fact, it is contended by the advocates of the plate system that less metal is required in the flanges of a girder of that description than in one designed on the lattice principle. This statement is not without some foundation, but can scarcely be said to be practically determined, insomuch as in the case where a continuous web is closely rivetted to a flange it is impossible to say how much of the longitudinal strain in the latter may or may not be resisted by the former. There is no doubt that in a correctly-designed and proportioned structure the sum of the shearing and longitudinal strains will be resisted adequately by the sum of the actions of the flanges and web, but whether each of these separate parts of the girder performs exactly its own duty, neither more nor less, is a question that will probably never be satisfactorily or conclusively determined.

Whatever may be the particular form of construction in which lattice or open bars are substituted for the solid plate, the object is the same. This consists in bestowing upon the form the same amount of strength, stiffness, and stability, with either a less amount of material or workmanship than is required in the latter instance. It has been frequently maintained that no amount or distribution of trussing and bracing can ever offer the same degree of rigidity as a solid plate. This is an error, and probably arises from the fact that so many badly-designed trusses have been constructed. These have been put forward as the best examples of that particular type of iron construction, and the system has been unjustly blamed for the fault of crude and unscientific examples. We have not the slightest hesitation in asserting that a properly-designed and proportioned truss is as strong and stiff as any solid plate could make it. We will not say stronger, for fear of misunderstanding in the matter. If there is one example of iron construction which more than another requires the greatest amount of individual strength and stiffness, it is a crane. The heavy weights it has to support, loaded also at the most disadvantageous point where the moment of fracture becomes a maximum, and the constant and violent jerks to which it is subjected demand that it should be exceptionally well designed with regard to the important element of rigidity. There are no doubt some who, while they would recognise the propriety of erecting a lattice girder, would hesitate before

extending that principle to the construction of an iron crane. Notwithstanding, iron cranes to lift twenty tons have been successfully constructed of lattice work, and have continued to give no signs of weakness. Among the other applications of the trussed types are those of lighthouses and piers, with the latter of which we are at present concerned. No sooner was it found by experience that the braced principle was applicable to the superstructure of bridges, than it was suggested it might be made available for the substructure as well. One of the best-known instances of its employment in this country is that of the Crumlin Viaduct in Wales, but it has been used for similar purposes in other localities, both here and abroad. For some reasons not clearly apparent, iron piers have as yet scarcely been introduced into France. There are but two examples, which are on the Orleans line. One is at Montlugon, and the other near Commentry. This class of piers are particularly well adapted for great heights, and the general features of their construction embrace the erection of a series of cast-iron pillars, trussed and framed together by lattice work. In accordance with the rules that govern the construction of all piers and supports of that description, they are built with a batter uniformly increasing from the summit to the base. Instead of a uniform batter, the whole pier is sometimes built in a succession of stages, the higher one being somewhat smaller in area than that below it. This method has the advantage of keeping all the uprights perfectly plumb, but, on the other hand, it breaks the continuity of the pillars, which is maintained when a uniform batter is adopted.

A brief description of one of the examples to which we have alluded will explain fully the method of building usually prevalent. The cast-iron pillars or columns are 1ft. 8in. in diameter, four in number, and are grouped in the shape of a rectangular pyramid, being united by bracing, which consists of a series of struts and ties placed horizontally at about every 15ft. in height, and of a similar truss situated in the vertical plane of the pier. At the lower extremity of these piers they are secured from the effects of the wind by inclined struts, forming a kind of counterfoil or buttress. The piers are based upon a foundation of masonry, and present a very solid appearance at the lower extremity. In designing the bracing of a structure similar to a high pier, the component parts must be able to withstand a strain of both compression and tension. The lateral deflection, which may be the result of either too great a weight upon the pier, or of a violent side pressure arising from a hurricane, may be either inwards or outwards. If inwards, there will be a tendency to compress and buckle up the bracing placed between the columns, and if outwards, they will be extended. If an open-sided lattice or pier be correctly built, it may certainly, under any strain that could not be taken into account *à priori*, give way bodily, but it is impossible that it should yield in any one particular part. It must all go together, or not at all. Each bar and brace will be doing its own duty, and will refuse to yield unless its fellows yield with it. This constitutes the perfection of bracing, which, when scientifically executed, will ensure a degree of resistance and strength far beyond that which would be expected of it from its light and elegant appearance.

THEORY OF THE ARTS.

(*Continued from page* 390.)

THE brief *résumé* of art conceptions as given birth to in Asia and perfected by the Greek mind will, I trust, not have been tedious to my readers, the principal object being to show the marked change in the mental process which takes place under Greek thought and civilisation, as historical proof of the more direct object of this essay which we shall presently have to consider. There was a general *fusion* of ideas among the Asiatic nations. The world of sense and the world of thought; the natural and the supernatural; mysticism and science were blended or confounded, and a mytho-æsthetic-spiritual form of thought prevailed, highly inventive and capricious, but notably failing to exercise any but a local influence.

The Greek mind was differently constituted, as we have seen; the climate and the surroundings were both different.

Taking the Asiatic prototypes of art as their departure, the Greeks applied a new process to them, developing all that was susceptible of beauty of form, gradation of parts, and mental or abstract refinement. Hence we have the Pelasgic or Asiatic spiral tastefully adapted as a volute; also the Assyrian honeysuckle exquisitely conventionalised as an ornament to the Ionic order. Taking the Asiatic prototypes of those features and comparing them, we see at once the influence of the Greek mind in subduing the over-naturalistic expression of the original types, and making them more consonant to the more rigid architectonic forms. This process of conventionalising nature—regarding forms in the abstract and combining them with a consummate taste and judgment, was carried by Greece to a greater extent than found among other nations. Thus its architecture was essentially the predominant art, to which the other arts of sculpture and painting bore an harmonious relation. This is particularly noticed in the sculptural accessories. The principal folds of draperied figures, their *pose* and attitudes, were all regulated and disposed by the architectural lines, the round masses being skilfully brought into conjunction with the square forms of the structure. We find also a wonderful harmony between the voids and supports; an agreeable contrast between rounds and squares, light and shade, and the effects of perspective. For example, we see the echinus delicately separated from the shaft by its annulets, while the abacus casts upon it a shadow of infinite gradation and of a hyperbolic outline. Indeed, from the Rock-cut temple at Beni Hassan to the oldest Doric temple, viz., the hexastyle temple at Corinth, there is a noticeable improvement; and from that at Corinth to the Parthenon—a step of about 200 years—a refinement even more marked.

Reverting again to Greek sculpture, the highest conceptions show a marked emancipation from the grosser ideas of earlier nations. Its own progress also indicates this. From a remote period, when fetichism, or matter worship, existed, to a period when religious reverence was somewhat displaced by philosophical speculation and schools, there were transitional phases in the art which show a gradual approach to anthropomorphism. Hence, we hear of painted wooden idols dressed in real clothes; and even as late as the time of Phidias there were wooden statues with marble heads. These were at last superseded by the nobler conceptions of a speculative age, when images were regarded as embodiments of the beautiful and of deified attributes. Statues that had before been worshipped were now viewed as works of the artist. Every statue typified some ideal of the mind; and sensual beauty found its embodiment in the naked Venus. Thus also Greek mythology passed into the realm of poetry and allegory, and art aided much in the transition. The athletic games of the Greeks also fostered the ideal of corporeal beauty. Greece ever aimed at the *perfection* of the natural faculties, and supplied that corrective which the Asiatics needed to prevent them from falling into gloomy or perverted ideas. Beauty, as I have said, was a principle of the Greek religion; games were even instituted, when prizes were awarded to the most beautiful; and a perfect mastery of the forms of man and animal was, according to Plato, the basis of instruction in design. The philosophers, moreover, recommended the study of art as a means of elevating the perception of beauty, while every artist was a philosopher. Religious feeling and patriotism were thus linked to art, and the reciprocal action thus engendered was beneficial, and promotive of that excellence which even now astonishes civilised mankind.

There is a broad distinction to be drawn between Greek and Roman art. Greek art was the product of a free nature and unfettered mind; Roman art was practical and vigorous, but was the offspring of minds fettered by State control and under despotic rule. Its vigorousness arose more from the necessity there existed for the varied requirements called into exercise by Roman life and conquest than from any originality in the conceptive faculties of the people. Borrowing freely their ideas from the Greeks, Etruscans, and other conquered nations, they soon produced a national style of art characterised by a stern, stately expression, yet varied by the introduction of new elements, and by the necessities of military life and discipline. Greek architecture was the expression of an intellectual abstraction, not like Roman, which was more pliant in its adaptation and combination, and essentially practical. The introduction and combination of that important element, the arch, gave it, moreover, a flexibility and a distinctiveness of its own which Greek architecture did not possess. Out of this element new combinations easily suggested themselves, and a greater degree of lightness of construction was attained which was impossible with the pure trabeation of the Greeks. The vault and cross-vault were quickly developed, and with the domical vault which also followed, the Romans were enabled to rival their Greek models in grandeur of conception and variety of effect. Again, the multifarious requirements of Roman civilisation exercised a wonderful influence over architectural expression. The imposing scale of their structures, their bridges, aqueducts, amphitheatres, baths, basilicas, &c., required more of that practical *activity* which gives little leisure or ability for the æsthetic refinements in which the Greek artists so excelled. Hence the expression of Roman architecture is that of physical and muscular energy rather than the intellectual culture and taste which pervades every proportion and member of a Greek temple. The religious aspect of Roman civilisation was also different to that of Greece. The beautiful and charming deities of the Greeks were transmuted into heroes or tyrants, severe and arbitrary, repulsive more than captivating. Instead of personified abstractions of beauty, intellect, love, and other divine and natural attributes, the Roman divinities are ferocious, unmerciful avengers, and we are told that of the 30,000 deities to which the Romans paid an unwilling adoration, the majority were impersonations of the baser passions and qualities of mankind.

G. H. G.

(*To be continued.*)

M. ANGELO'S LAST JUDGMENT AND "HOLY FAMILIES."

IT would be vain to attempt to do full justice to the great work of M. Angelo in the Sistine Chapel without going into detail with a minuteness probably wearisome to those who have not given it a good deal of previous thought and study; but yet there are some things to be noted in these frescoes which may prove interesting in detail even to those who know little more of the paintings than the bare fact of their existence. A few words, therefore, in addition to what has already been said in a recent number of this journal may be useful and instructive on the great series of "Holy Families," as they are termed, which run all round the ceiling and immediately over the windows of the chapel. They are to the many the most interesting paintings of the whole series, inasmuch as they are the most purely human and, life-like, and as, in them, M. Angelo has evidently thought to

enter the lists against Raphael, and to show to the world that, though he could paint the the almost superhuman, he was equally able to master the living and human. Nothing can possibly surpass the masterly conception, and drawing, and painting of these compositions. They commence with the lunette immediately under the "Jonah," which closes the series of Prophets who foretold of the future of Israel and they occupy in sets (though with some omissions, according to the genealogy in St. Matthew) the spaces left vacant between the Prophets and Sibyls, and cross the chapel alternately. Leaving the simple manipulative part of the work to a future occasion, viz., the drawing, painting, light and shade, and the composition of the several groups, and the probable mode of their realisation and inspiration, we may confine ourselves to the work as it now exists, happily *unrestored*, and as visible in autotype to those who cannot go to the chapel itself to see them.

These sublimely-beautiful compositions are twenty-two in number. They consist of groups of figures and of single figures, which but obscurely realise the meaning of the texts which they are meant to illustrate. Of some of them a few scattered notices are to be found in various parts of the historical books of the Bible. They commence with

Aminadab, the father of Naason, and the seventh in descent from Abraham. In the opposite lunette is a female figure without name.—Naason as a youth reading from an open book. It is said in the Book of Numbers: "And the Lord said to Moses: Let each of the princes offer a gift for the dedication of the altar; and Naason, of the tribe of Judah, offered his offerings for the sacrifice." In the opposite lunette is a female figure without name. the careless grace of attitude, drawing, and expression of this youthful figure are beyond the power of words, and the dreamy light in which it is seen is marvellous—Salmon, the next in succession, is indicated by a family group—a mother and naked children, with their father—Booz, his son, by a mother and child. Obed, the father of Jesse, by a patriarchal figure leaning on a staff.—Jesse. "And the Lord said to Samuel: Fill thy horn with oil, and come, that I may send thee to Jesse the Bethlehemite, for I have provided me a king among his sons." Obscurely indicated by a family group—a mother and two children. David the King, the sweet singer of Israel. Solomon the King, indicated by the great painter by the figure of a woman seated and plying a distaff, perhaps weaving the thread of the life of the Kingdom of Israel—its glories and its woes. It was Solomon the King who built the House of the Lord, and who made the Ark of the Lord with the cherubims, and to whom it was said that, "Since the day that I brought my people Israel out of Egypt, I chose no city out of all the tribes of Israel for a house to be built that my name might be there; but I chose David to be over my people Israel.—Roboam, his son, and his mother's name was Naama, an Ammonitess. We are told that he did evil in the sight of the Lord. This beautiful composition, a mother and child, was probably meant by the painter to represent Roboam, his wife, and child.—Abias, "who also walked in all the sins of his fathers," also indicated by a mother and child. In the opposite lunette is a grand conception, or rather recollection, of a figure seated, and resting its head on its knee. It is without name.—Asa, "who did right in the Lord's sight, as did David his father. Moreover, he removed his mother from being queen, and destroyed her den, and broke in pieces the idol in it, and burnt it with fire." Indicated by a mother and child: doubtless the mother of Asa mourning over her loss. The demoniacs above, in the spandrels over the pointed arch, are triumphant in drawing and in indication of evil.—Joshaphat, as a man writing on a leaf of paper, and Joram, his son, represented by a beautiful group of a mother and children.—Ozias, by a mother and child.—Joatham, indicated by a mother and child, pointing to some object out of the picture. "And Joatham did right in the sight of the Lord, only that he entered not into the temple of the Lord. Moreover, he built cities in the mountains of Judah, and castles and towers in the forests."—Achaz. It was he that "burnt incense in the valley of Hinnom, and made his sons to pass through the fire after the manner of the nations which the Lord slew at the coming in of the Children of Israel."—Ezechias, by a mother and children. "He did that which was pleasing in the sight of the Lord. He it was who opened the doors of the House of the Lord."—Manasses. "He was twelve years old when he began to reign," We are told that "he did evil before the Lord, according to all the abominations of the nations which the Lord cast out before the Children of Israel. And he turned and built again the high places which Ezechias his father had destroyed, and built altars to Baal, and made groves; and he adored all the host of heaven. But afterwards distress came upon him, and he prayed to the Lord his God." Shown by a mother and her two children.—Amon, the child in the lap of the mother. "He did not humble himself before the Lord as Manasses his father had humbled himself, but committed far greater sins.—Josias. "Josias was eight years old when he began to reign. And he did that which was right in the eyes of the Lord. He declined not, neither to the right hand nor to the left. And they broke down before him the altars of Baal, and cast down the idols and strewed the fragments upon the graves of them that sacrificed to them. And he burnt the bones of the priests on the altars of the idols. Is it not found written in the Lamentations how all Jerusalem mourned for Josias, and how how all the singing men and singing women repeat it to this day, and it became like a law in Israel?" A beautiful composition, a father, mother, and child, probably the young Josias.—Jeconias and his brethren, under whom Israel was carried captive to Babylon. A mother and child. This wonderful group is indeed a daughter and mother in Israel in the days of the captivity. "By the waters of Babylon she sat down and wept."—Salathiel, his son. A father and son.—Zorobabel, by a father, mother, and child. The demoniacs in the angles above are rather gigantic shadows than palpable forms.—Abiad, his son, indicated by a mother and child. A magnificent daughter of Israel, truthfully drawn from a keen remembrance of the form and face of the race from which she came.—Eliakim, by a father and child.—Azor, indicated by a woman and child.—Next, Zadoc.—Achim, father and child, and Eliud, mother and child.—Eliazar, by a father, mother, and child; and Mathan, a magnificent group of a father, wife, and child. The head of the man cannot be surpassed; it seems the type of humanity.—And last, Jacob, indicated by a patriarchal figure of a man, his wife, and child.

It is to be noted that these Holy Families commence at the end of the ceiling, immediately over the Last Judgment, and then follow each other alternately on either side of the chapel, and not round it, till the series is concluded by the two at the other end of the chapel over the entrance doorway. Nothing can surpass them in beauty and human interest. They complete the idea embodied in the ceiling, viz., The Progress and Triumph of Theocracy.

Many, almost numberless, engravings have been executed of these magnificent frescoes, but they give no idea of the actual power and life which the original paintings, as they exist on the Sistine ceiling, display. It is only now that they have been reproduced in *fac simile* in autotype, line for line and touch for touch, that we are enabled to see into them, and to realise to ourselves their wonderful power and force. These frescoes complete the story as told on the ceiling, but the whole of the grand idea in the mind of the painter could only be wrought out fully by working on the walls of the chapel as well as on the roof of it. The Last Judgment was but the necessary sequel to the story told on the ceiling.

On the end wall of the Sistine Chapel, and directly opposite the entrance doorway, is this great picture of the Last Judgment. It was begun in the year 1533, and finished in 1541, when the painter was in his 68th year.

It represents the Final Judgment in its actual accomplishment, and in it, Christ, as the Judge of the World, and surrounded by angels and apostles, is judging the world. It embodies the same idea as it is seen in the Byzantine paintings in the apsides of the great Romanesque churches, and was the common thought of the early and middle ages. "As the lightning cometh out of the east, so shall the coming of the Son of Man be; but of that day and hour knoweth no man."

In the centre of this great picture are the seven angels with the trumpets of doom, calling to judgment; and there are the open books in which are recorded the good and ill of all men. At the sound of the trumpets the rocks are rent, and the graves are opened. At each blast of these fearful trumpets another and another generation of men rise to judgment from their long sleep. Above this centre group is the Christ, the Ancient of Days, surrounded by angels and apostles, and with the Virgin Mary by his side, and with upraised hand condemns the ungodly and the wicked, embodying the dread sentence, "Depart from me, ye that are accursed, into outer darkness, where there is weeping and gnashing of teeth."

To the right and left of this centre group, as well as immediately surrounding the person of the Judge of mankind, are circles of the resuscitated blest. In the right hand group is the Baptist; in the left, Saints Peter and Paul, Adam and Eve, and the saints of the Church, S. Andrew with his cross, S. Bartholomew with his skin, S. Lawrence with the gridiron, S. Sebastian, S. Catherine with her wheel, and with them are friends on earth reunited in this newer earth. Above these, and in the semicircular arches of the picture, are companies of angels and seraphic beings bearing the cross, the crown of thorns, and the other instruments of the Passion of our Lord. The whole of this upper portion of the picture embodies the idea of the final acceptance of the blessed into glory and unending happiness, and is expressive of the words: "Come ye blessed of my Father, inherit the kingdom prepared for you from the foundation of the world, for inasmuch as ye have done it unto one of the least of these my brethren, ye have done it unto me."

But it is in the lower part of this great picture that the stern genius of Michael Angelo has perhaps best shown its powers. On the right and left of the recording angels, and immediately beneath them, in the corners of the picture, are the lost and fallen of the race of men. In the left-hand corner are the rent rocks and opening graves, out of which are rising those who are coming to judgment. The ministering angels are aiding the elect and chosen, while the unrighteous are being dragged down by avenging demons; the proud by the hair of their heads, and others in the ways which best express the nature of their several mortal sins. Grief and despair and terror and confusion are seen in the forms and faces of the reprobate and lost. They hear the fearful words—Depart, depart from me ye accursed; ye that must drink of the wine of the wrath of God, poured out without mixture into the cup of his indignation. In the Middle Ages this tremendous idea of a final judgment and day of doom took entire possession of the minds of men. *Dies iræ, dies illa*—that day of wrath, that day of dread,—was the ever and reiterated cry. In the great pictures of the time it is found represented in

all its material and naked horror, and Michael Angelo has but given us his idea of it, borrowing from Dante, if that be possible, additional terrors. The whole of the lower part of this picture depicts the last and final end of the impenitent and unbelieving. Charon, of demoniac form and expression, in his boat, is crossing the dark waters of the fabled river Styx between earth and Hell, and the crowds of the reprobate are being received into the ever opening ranks of evil spirits. They pass into the presence of Minos, who apportions the doom of each one of them, and the final and irrevocable sentence is executed by the attendant and avenging demons, in that place where are fetters of iron, and hurled stones, and a furnace of blazing fire, and rivers of fire which burn everlastingly, and where "Hope which comes to all comes not."

It was the intention of the great poet painter to portray on the wall of the Sistine Chapel, opposite the Last Judgment, the Fall of Lucifer and the Rebel Angels, and thus to complete the tremendous idea of a Theocracy, and the final end and suffering of those who had rebelled against it.

C. B. A.

GOSSIP FROM GLASGOW.

(FROM OUR OWN CORRESPONDENT.)

SINCE I last wrote, the two chief professional "events" have been the reception by the Water Commissioners of the competitio designs for the memorial fountain, and the laying, by the Earl of Dalhousie, of the "foundation" stone of the Albert Bridge. Notwithstanding that the fountain (if erected), is to be paid for by the public money, the Commissioners have not publicly exhibited the designs, and consequently I am meanwhile unable to either criticise or describe them. It is, however, otherwise with me respecting the bridge ceremonial, as in that "pomp and circumstance" I had the equivocal honour of "assisting." The bridge itself is of a composite construction, being partly stone and partly iron, is in three arches, is to cost about £50,000, and has been designed by local engineers, Messrs. Bell and Miller. Besides the one in progress the Clyde at Glasgow is spanned by four bridges, two suspension ones and two of granite—one having five arches, the other seven, and both of noble proportions and admirable design. The oldest of these bridges has been built within forty years, but the others within twenty, and the foundation-stone of the Albert's predecessor was laid so recently as 1829. It seems that so short-lived a span was occasioned by the undermining of the piers from the action of a weir immediately beyond them; but if the bridge was to "give way," it could not have done so more opportunely, as it was wholly unfitted for a traffic which must be vastly increased when the Salt Market is widened and straightened and has become a principal approach to the goods station of the Union Railway.

Besides the bridge itself the chief objects of interest associated with the laying of the foundation-stone were the temporary triumphal arch through which the procession approached, and the extemporised amphitheatre in which the ceremony was performed. Although these were erected only for the occasion, they are not unworthy of notice, inasmuch as it is rather in the character of our response to a sudden call, than in the maturing and perfection of a deliberate work, that the best evidence is seen of what is really within us. If in this instance there was a demand for art—and, as Touchstone says, "much virtue in *If*"—it must be said, I fear, that there was a most meagre supply. The arch was designed in a reckless rebellion against the simplest laws of proportion, and the details were outlined without any defence to either propriety in themselves or harmony with each other. It was after the antique—"its high top bald with dry antiquity"—so very much after it that the example studied may have been some old British savage's drawing, with all its imperfections on its head, of the last arch left by the Roman invaders—imperfections, however, that may be readily explained and excused, since it has now been ascertained, beyond doubt, that proportional compasses were wholly unknown to the ancient Britons, and that architecture was not systematically taught in the Government School of Design of the period. The decorations were not unworthy of the arch, were not too many, and were judiciously applied. The amphitheatre was a piece of upholsterydom—red cloth, blue and white calico, festoons of evergreens, trophies of flags, and insignia of "Masonry," and with the free-and-easy proportions of the arch and the tawdry finery of the "merrie Masons," however incongruous otherwise, was in happiest harmony with the associations of the place—the scene a month afterwards of Merry-Andrews, equestrian amphitheatres, penny shows, histrionic temples, and all the high-art means and appliances of Glasgow Fair. According to Gray of the Elegy, "where ignorance is bliss, 'tis folly to be wise," and the triumphal arch is deemed such a triumph of design that it has been allowed to stand for a week to delight and instruct the Salt Market successor of Bailie Nicol Jarvie.

There may be several causes assigned for our failure. It may be said that alike artists and artificers had too little time; it may be argued that it is scarcely worth while to do our best for a temporary purpose; but I suspect the real reason is, not only that we are unacquainted with that sort of work, but that we are not to the manner born, that we are awanting in that intuitive perception which in our continental neighbours makes every workman an artist, that as a people art is not a large constituent in our mental composition, and that little as it is we have done still less to cultivate it.

The Architectural Society took no part in the ceremonial; indeed, the only recognition of the profession was an allusion, at a banquet in the evening, to Mr. George Gilbert Scott as "the most eminent living architect."

When the Queen visited Glasgow a magnificent triumphal arch was erected at the approach to the Jamaica-street Bridge. This was designed by Mr. Rochead, and was in every way worthy of the city and the occasion. It was monumental in its character, grandly conceived and expressed, and had it been perpetuated in stone would have been a much more satisfactory memorial of the visit than Marochetti's trumpery statue. A companion statue of similar merit has been erected in memory of Prince Albert, and with this our loyalty might have been contented. But the "goodness" of the Prince must be commemorated *ad nauseam*, and accordingly the new bridge has been named the "Albert." Its predecessor bore the name of the Brothers Hutcheson, the founders of Glasgow's most munificent charity; and now that the bridge has filched from them their good name the City's conscience may perhaps its quietus make by erecting to them statues.

It is, unhappily, in not only temporary structures that we meet with clumsiness of detail. In a little building now being erected in Gordon-street the capitals of the upper pilasters are so out of all proportion as to be most monstrous. As it is no less than an ex-President that "honours this corruption" it can scarcely be ascribed to ignorance. An architect may be eccentric, but eccentricity is no apology for unskilful misadventure.

The Institute of Architects is having a seal engraved for it. It is Classic in its design, the subject being Pallas and the Parthenon. With such men employed upon it as Alexander Thomson, architect, John Mossman, sculptor, and William Wallace, a die-sinker of rare merit, a result truly excellent may be confidently expected.

I mentioned in a former communication that Mr. Salmon, a magistrate as well as architect, had in a paper read to the Society recommended that houses for the working-classes ought to be built not in the city but in its outskirts. The Improvement Trust has within these few weeks purchased two considerable estates which are to be laid out for such houses, one in the south-east, the other in the north-west, and neither much more than a couple of miles from the business centre. That in the north-west cost £35,000. I have not learned what was paid for the other.

As the Royal Exchange is the architectural pride of modern Glasgow, care is taken that in its conservation those employed are the very highest art-workmen. It will be admitted that few go higher than the slater, and accordingly, some years ago, one of those artists, acting upon the prosaic, but therefore common-sense principle that beauty unadorned is not adorned the most, and that to paint the lily is neither a wasteful nor a ridiculous excess, clothed the columns of the portico with an overcoat of oil-paint, and hid for ever from the eye the naked beauty of the texture of the stone. At the present moment other portions of the building are by a brother of the craft being thick laid over with a pale coat of colour, and although this may be required as a protection from decay, let us hope that as in the case of the columns the *dulce* will be not wholly sacrificed to the *utile*.

I see by your last week's issue that a Glasgow architect, Mr. Honeyman, has been exhibiting, and with credit, in Conduit-street. Our only apology for a great architectural exhibition is the hanging annually of a very few drawings on the walls of the "Glasgow Institute of Fine Arts"—and this year, for the credit of the profession, they could have well been even fewer.

Mossman is busy with busts of two local notabilities, the late Professor Penney, of Anderson's University, and Sir James Lumsden, the late Lord-Provost; and Mr. Ewing is in London working at a bust of Mark Lemon.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE last ordinary general meeting of the Institute for Session 1869-70 was held on Monday evening last, Mr. E. I'Anson, vice-president, in the chair. Mr. Alexander K. Mackinnon, of Monte Video, having been elected a Fellow,

Mr. SEDDON read a short report on the result of the Voluntary Architectural Examination for 1870. In the preliminary examination, the three gentlemen who passed were Mr. Joseph B. Cohen, Mr. Thomas J. Street, and Mr. Thomas Garrett. In the examination for proficiency, the following gentlemen passed:—Mr. Walter L. Spiers, Mr. William Scott, Mr. Thomas Munday, and Mr. John S. Quilter. For the proficiency examination six candidates presented themselves; of these, the four gentlemen already named passed, one failed to pass, and the last one fell ill during the progress of the examination. The result of the examination this year was very well received, and it shows that the yielding of that bone of contention, the certificate, has been so far productive of good.

Mr. Seddon next briefly described some examples of ecclesiastical decoration recently discovered at the Church of S. Nicholas, Great Yarmouth, and in a church near Aberystwith. There was nothing in this paper that could be intelligibly reported without the aid of diagrams. A discussion of an archæological character ensued, in which Professor Donaldson, Mr. Penrose, Mr. Edwin Nash, and Mr. Wigginton, took part.

Professor KERR next proceeded, in a speech of some length, to offer some

SUGGESTIONS AS TO THE FUTURE MANAGEMENT OF THE VOLUNTARY ARCHITECTURAL EXAMINATION.

The learned Professor said that his attention had been particularly directed to the Voluntary Architectural Examination of late, as he had, in conjunction with Messrs. Penrose and Aitchison, acted as Examiner this year, and as Mr. Ferrey's absence from town had prevented that gentleman from coming forward that evening with his promised paper on the west front of Wells Cathedral, he (the Professor) had thought it a desirable opportunity of bringing forward a few suggestions of his own which, if adopted, would, while raising the standard of the Examination, greatly augment its popularity, and consequently its usefulness. As some excuse for doing this, he mentioned that he had taken a deep interest in the Voluntary Examination since 1852. After explaining the origin of the Examination, the Professor entered at great length into the working of the scheme hitherto, and proceeded to make his suggestions for its improvement. Firstly, he was inclined to think that sooner or later it would be a good move to have a permanent special committee of the Institute to take charge of the conduct of the Examination. At present, although it was fully as important a matter as professional practice or the conservation of ancient monuments (which both had special standing committees), the management of the Examination was left entirely in the hands of the Examiners and Moderators for the time being, and as these varied in their *personnel*, so to some extent would the mode of conducting the Examination vary. The next point he would mention was the fatigue—the unnecessary fatigue—involved in the Examination through compressing so much in so small a space of time. There were something like a dozen seperate subjects to be read up by the candidates in preparation for the Examination, and as the candidates have to "toe the mark" in all these subjects during the eight days over which the

Examination extends, all this reading up has to be done beforehand, and the candidates come to the Examination primed with all these subjects. The great labour thus necessitated, and the great strain entailed upon the mind, can be undergone by only the most robust, and many young men are thereby deterred from going up as candidates, or else "cramming" is resorted to. Now the subjects in which the candidates were examined were easily divisible into three classes, viz., art and design, science (in the abstract), and professional practice. These, then, are three distinct fields, and it seemed to him that a great deal of good would be done to popularise the Examination if each of these sections was taken separately and allowed to extend (say) over two or three years at the option of the student. The successful candidates in each of these sections should have some memorandum or acknowledgment of having passed in such section, and, on having successfully passed examinations in all the sections, should be certified by the Institute as having successfully passed the Voluntary Examination. By such a division of the subjects in which candidates were examined, it would be possible to greatly raise the standard of the Examination, and at the same time make it more popular. As regarded honours, he was inclined to think that the necessity of a separate examination for distinction did not exist. All that was desired could be most easily accomplished by the simple means of granting honours to the man who passed more than creditably. He would not allow any man to pass for half the number of marks set up as a standard, nor for anything like half the number of marks; but when a candidate came considerably over three-quarters of the marks, he would grant a certificate of distinction. If anything like this scheme could be carried out, it would materially reduce the fatigue of the Examination, and would allow of one week being given to each section of the subjects in which candidates were examined. With regard to the inconveniences attending the examination of candidates from the provinces, the Professor did not see why young men from the provinces should be under the necessity of a three-weeks' stay in London in order to pass the Examination. He suggested that local Fellows of the Institute should be entrusted with the examination of local candidates, under strict conditions laid down by the Council, and upon the Council being assured that such conditions had been fulfilled, why should not those candidates have certificates? Coming to the question of rewards, the Professor stigmatised the rewards of the Institute to its students as stingy, and said he thought the sooner it adopted a system of introducing a practical, an honourable and profitable connection with its students, the better for all parties. He ventured to suggest that the preliminary examination should be a sort of matriculation examination, and on passing that Examination, candidates for the examination for proficiency should become free students of the Institute for a certain number of years without paying any fees. Then, the man who won the diploma or certificate of competency ought to have on easy terms an Associateship of the Institute as a matter of right, and a Fellowship when he had fulfilled his seven years' probation in the profession. He thought the Institute would be honoured by having such Associates and such Fellows as much as such gentlemen would be honoured by their connection with the Institute. After referring to some mere matters of detail in the working of the scheme, Professor Kerr concluded by asking for his suggestions careful and attentive consideration, as he was convinced that some such reforms as he had suggested were necessary to be carried out before the Voluntary Architectural Examination could take its proper share in elevating the standard of professional education, and increasing the *prestige* of the Institute.

In the discussion which followed,

Mr. WIGGINTON expressed his sympathy with all that Professor Kerr had said on the general question, but thought that the certificate or diploma which was to to be granted by the Institute to successful candidates should receive Government validity, and be a diploma in the same sense as that of a surgeon.

Mr. SEDDON approved of Professor Kerr's suggestions as to dividing the Examination into sections, and he thought it would be a good thing to make the certificate or diploma more valuable in some shape or other. The Examination should be so conducted as to be less liable to be passed successfully by mere "cramming."

Mr. T. ROGER SMITH deprecated any change in the period over which the Examination at present extends, as he thought that for a man to have to pass the Examination as at present constituted was the best possible safeguard against "cramming." With the suggestions made by Professor Kerr as to attaching some substantial value to the certificate he cordially agreed, and also with the suggestion that the Voluntary Examination should be under the special charge of a standing committee. He therefore begged to move, as a recommendation of the meeting to the Council, that it was desirable that such a committee should be appointed.

Mr. R. P. SPIERS, speaking on behalf of the younger members of the profession, and as one of those who had gone up as a candidate in the first year of the Examination, concurred with the Professor's recommendations.

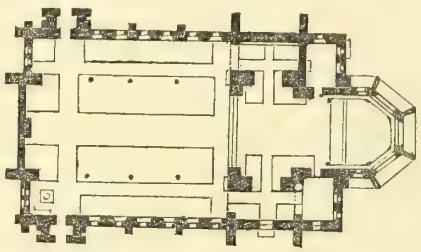
Mr. E. NASH seconded Mr. Smith's motion.

Mr. FOWLER deprecated inducements or rewards being held out to candidates in these examinations. Passing honourably through such a severe ordeal should be its own reward.

After some further conversation, in which Professor Donaldson, Mr. Eastlake, Mr. Charles Barry, Professor Kerr, Mr. Seddon, Mr. Hiscocks, and Mr. T. Roger Smith took part, the latter gentleman withdrew his motion of recommendation in favour of one proposed by Professor Donaldson, to the effect that the present system of conducting the Examination be referred to the Moderators and Examiners, with instructions to report thereon to the Council if any and what improvement can be made therein, and as to the rewards given to those who distinguish themselves. This having been carried, the meeting terminated with a vote of thanks to Mr. Seddon and Professor Kerr.

BEXLEY HEATH CHURCH.

THIS design, by Mr. Wm. Knight, artist, of Nottingham, which we illustrate this week, was chosen in accordance with the advice of Mr. Burges, from a number of drawings furnished in competition by twelve architects invited to compete by the committee. The plan is cruciform, consisting of nave, north and south aisles, transept, and chancel, and north and south porches. The roof will be of open timber stained and varnished, and slated on the exterior. The chancel will be formed with curved principals and plaster ceiling. The walls will be faced with Kentish rag stone. The interior will be plastered.



BUILDING NEWS SKETCH BOOK.—XXXII.

S. GERMAIN'S, CORNWALL.

ON the banks of the Lynher, a small but beautiful tributary to the Tamer, stands the almost deserted town of S. Germain's, whose church is a fine old Norman structure, containing, we are told, the ashes of those who were among the founders of Christianity in Britain.

Before the noble towers of Exeter crowned that ancient city, this was the Diocesan Cathedral of Cornwall, built and dedicated by the Saxon king, Athelstane, to S. Germain, Bishop of Auxerre, who came into Britain with Lupus, Bishop of Troy, in the year '426, and was succeeded (according to a list affixed in the interior) by the following bishops:—S. Patrick, Athelstan, Coranus, Ruidocus, Udridus, Bretivinus, Burwoldus, Athelstan, Wolfi, Woronus, Wolocus, Stillio, and Aldredus, when the see was removed to Exeter.

Of its architecture little or nothing remains of the Saxon era, as some authors affirm, but the whole of the west front, porch, and nave is Norman work, exceptionally beautiful.

At present the building consists of a nave, two western towers, south aisle, and originally a north, of which only the foundations remain. It is said that during some recent excavations, the footings of sanctuary were discovered. There are few objects of interest in the interior save the Norman font, sedilia (or supposed bishop's throne, which is evidently of too late a date to have answered that purpose), piscina, and fragment of the old stalls (subject of illustration). Those beautiful sculptured fragments of this part cannot fail to impress the beholder with ideas of its former grandeur.

H. A. G.

THE SOCIETY OF ARTS ART-WORKMANSHIP COMPETITION FOR 1870-71.

THE Council of the Society of Arts intend in their Art Workmanship competition of next year to suspend for a time the form hitherto adopted in offering prizes for art workmanship, believing the change is likely to be beneficial to the object the Council have at heart, viz., to see the art workmen of the United Kingdom occupying a good position in the coming International Exhibition in comparison with those of other countries.

With this view the Council have decided upon offering a series of rewards for special excellence on the part of all concurring in the satisfactory production of works of industry of the highest character. They consider that they can most effectually ensure their object by offering to manufacturers the highest distinctions they have it in their power to confer, and to workmen liberal money premiums. They desire to obtain, from those who may be willing to compete for the prizes they offer, specimens of art manufacture, which will have to be sent to the society's rooms by the 14th of January, 1871. These will be immediately judged upon their merits, and the premiums enumerated below will be awarded. An endeavour will be made to effect arrangements by means of which every object receiving a premium, or selected for the distinction of being exhibited, will be placed in the coming International Exhibition as a contribution on the part of the Society of Arts, showing the result of recent efforts which have been made to improve art workmanship in this country. The specimens of manufacture sent in in competition for the above rewards and premiums will have affixed to them the name of the designer and of the workmen in each special branch of industry involved in the execution of the work. Every workman will be eligible to receive money premiums proportionate to his merits, and to the degree in which he may have contributed to the successful results of the whole, whilst the manufacturers may receive the gold or silver medals of the society.

The society hope that they may receive objects enabling the judges to award the society's gold medal to manufacturers, and the society's silver medal to manufacturers or designers—accompanied, in the latter case, if the circumstances appear to call for it, with money premiums; and to the art workmen money premiums varying from £3 to £20, and to the extent, in the whole, of £500.

These works may obviously include specimens not only of the taste of the designer, but of the skill of the carver, inlayer, metal worker, chaser, bronzist, engraver, china painter, die sinker, cameo cutter, glass worker, enameller, mosaicist, and other art workmen, either separately or in any combination arranged.

No object involving combined labour for its production will be eligible for reward unless accompanied with the names of all those engaged in its production, to the most meritorious f whom—whether their works may be exhibited in the rooms of the society or in the International Exhibition—every effort will be made by the Council to give publicity and attract attention.

SOCIETE DES ARCHITECTES DU DEPARTEMENT DU NORD.

THE Société des Architectes du Departement du Nord intends holding a "Concours d'Architecture" at Lille this year, for the exhibition of photographs of executed work. The object selected is an entrance door for a dwelling house. The door may be of any material or style, either large or small, simple or grand. It may also be a door with grilles instead of wooden panels, but an opening grille will not be admitted. Doors of public edifices are excluded from the competition. Photographs of the works must be forwarded by the 30th of September.

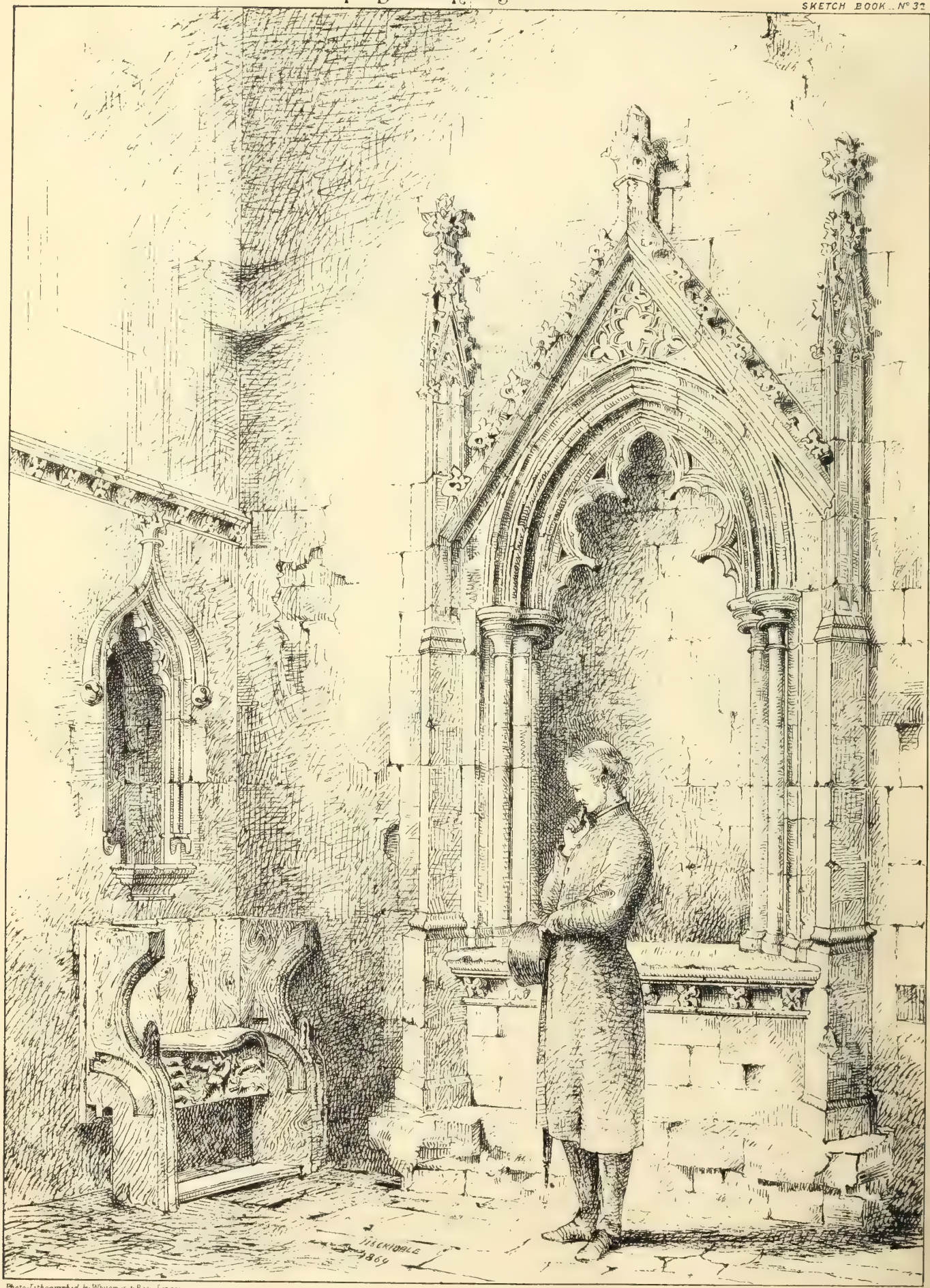


Photo-Lithographed by Whiteman & Bass, London

Herbert H. Gribble del

Sedilia and Stoup,—St. Germain's,—Cornwall.



Photo Lithographed by Whiteman & Bass, London

Proposed New Church, Bexley Heath, Kent.

WILLIAM KNIGHT, ARCHT., NOTTINGHAM

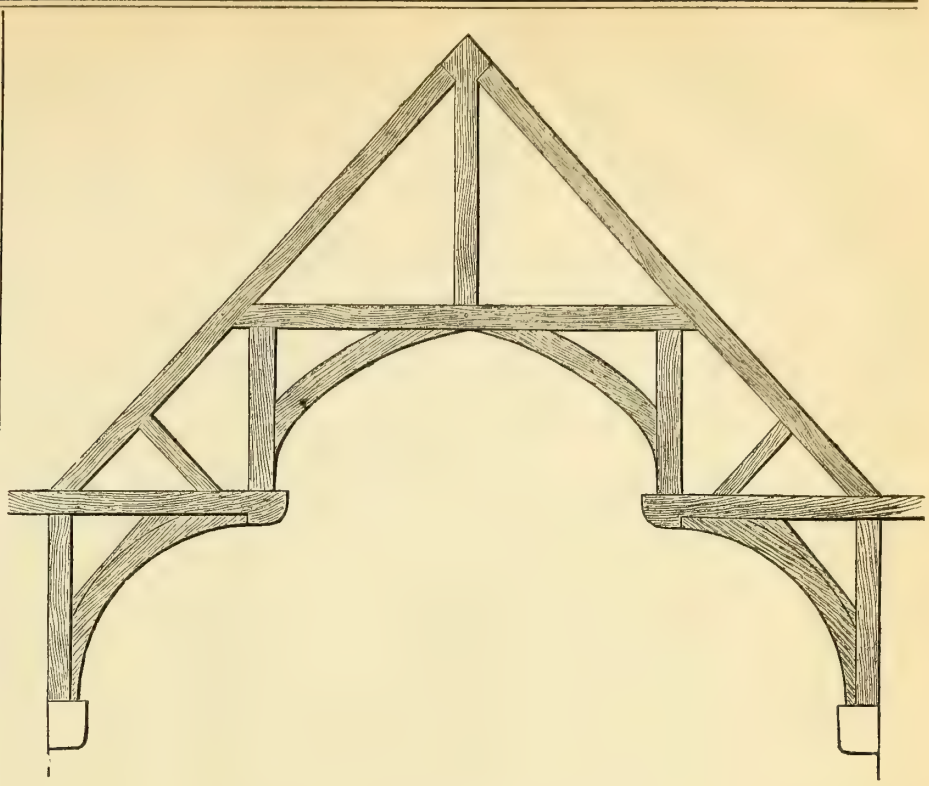
BRIEF CHAPTERS ON BRITISH CARPENTRY.

By Thomas Morris.

(*Continued from page* 438).

AS Westminster Hall affords the chief example of arch ribs, so Westminster School is perhaps the best representative of a very numerous class which I need not hesitate to call the "Bracket Roof." The history of this piece of carpentry is involved in that of the place, and Westminster has been a seat of education from remote times. Ingulphus, son of an officer in Edward the Confessor's court, was engaged as secretary by William of Normandy when he visited the English king. After the Conquest Ingulphus was made Abbot of Croyland, and tells how for the attainment of learning he was put to Westminster School. Fitzstephen, secretary to Thomas à Becket, has left a record from which Stow concludes the principal schools of the metropolis to have been at S. Paul's, Westminster, and Bermondsey Abbey. But very different from the present was the Westminster School of monastic ages:—"In the north cloister sate the prior, and in the western sate the master of the novices with his disciples." At the Reformation the institution passed at once into a new stage. The Abbot was converted into a Dean, and the monks were succeeded by prebendaries. In the new organisation a school was founded here, as at Canterbury and other places, but the ecclesiastical element was long so intimately blended with the scholastic that the Dean from time to time seemed almost to supersede the functions of the head-master. Of all the schools which the princes of the Reformation planted in the heart of the cathedrals of England, Westminster is the only one which adequately rose to the expectation of the Royal founders. The benefits to literature and intelligence may fairly, however, be weighed against the architectural prodigies which adorned the ages before. But a new form of scholastic government did not demand new buildings, and an apartment of the abbatial edifice had only to be converted. The school-room still covers the same space, and its walls are inscribed with famous names, which in long hereditary descent rival probably any place of education in England. Its roof is of the thirteenth century—one of its windows of the eleventh. Such, at least, appears the impression of Dean Stanley, who has so appropriately included notes on the school in the historical memoirs of his church:—"The traces of Westminster boys," he says, "who have played in its cloisters and inscribed their names on its walls, belong to the story of the Abbey, no less than its venerable beauty, its solemn services, and its lofty aspirations." Great men have been masters—Camden, Busby, Vincent Bourne, and Jordan. Greater men have been scholars—Ben Jonson, Cowley, Dryden, Prior, Cowper, Southey, Gibbon, Earl Russell, and if I speak doubtingly of John Nash, at least one great architect—Sir Christopher Wren.

As to the age of the roof, a dormitory erected by Abbot Lislington in the reign of Edward III. was appropriated to the school at the Reformation, and the original roof may have been preserved. It would thus be carried back to the fourteenth, not the thirteenth century; but under a belief that no bracket roofs are anterior to Westminster Hall, I think they would be more correctly assigned to the fifteenth. The thick Norman walls were fully capable of supporting the untied roofs, and the thrust was uniformly deposited at short intervals when each pair of rafters bore its proper share of the weight; but when lighter, though more compact, walls of brickwork came into use, and the system of concentrating the pressure by purlins and principals obtained, some expedient for increased security became desirable. The machine called a crane, commonly used in building and commercial operations for hoisting weights, indicated the exact object required. The crane



BRACKET ROOF, WESTMINSTER SCHOOL.

consists of a projecting beam at the top, called the jib, an upright post or standard, and an oblique connecting piece called the spur. The triangular figure of this machine imparts to it very great strength. In application to roofs, the jib is placed at the top of the wall, with the direction of which it forms a right angle. The post stands against the wall upon a projecting corbel, and sustains the oblique pressure of the spur. The jib being laid across the wall, receives at its outer end the foot of the principal rafter, which acts as a weight or fastener. Upon the inner end of the jib is raised a vertical queen-post, to stiffen the principal rafter at about the middle of its length, where support is of course most necessary. Just about the intersection of queen-post and principal a level strut is ordinarily introduced, and the chief difference is that in some cases this strut comes between the queens, near their top, and in others it passes over them, as at Westminster School; but either way the same object is attained. The pieces forming the spurs are generally curved, convex outwards, and an arch of similar curved pieces fills the space between the queens, and rises to the under side of the level strut. As if to emphasise the connection of these designs with the crane, there is usually a drop-weight or pendant beneath the inner end of the jib, whether the queen-posts are continued downwards or not. Auxiliary supports are generally contrived for the principals, but in very dissimilar ways; and although a king-post is frequent in the upper half of the roof, it is absent in perhaps an equal number of designs. The stability of the principle is attested by the many examples that have stood the trial of long service, though at Westminster the boast has to be somewhat moderated. A good view of the capacious interior is given in Ackermann's "Public Schools," aquatinted by Stadler, after a drawing by Augustus Pugin. A poetical scholar writes:—

> Fixed to support the roof above, to brave,
> To stem the tide of Time's tempestuous wave,
> Nine stately beams their spacious arches show,
> And add a lustre to the school below.

The lustre of the roof, however, is sadly dimmed by the introduction of iron rods that pass from wall to wall and from bracket to bracket — clumsy, inartistic expedients, at variance with the mechanic system of the work, and showing that the very traditions of ancient practice had passed away. The walls might have been bound and fortified, the principal rafters stiffened, decayed parts reinstated, the covering lightened, without disfigurement to an object of interest, offence to taste, or violence to truth.

In colleges, inns-of-court, trade halls, and mansions, roofs of this class abound, and they are very frequent in churches. Variety is sometimes attained by elongating the post next the wall, and fixing the foot of the spur at a considerable height above the corbel, when the lower part of the post admits of being treated as a shaft or pillar. The nave roof of Trunch Church, Norfolk, has brackets stilted in this way, and the spandrel of the bracket is filled by a perforated board, in the manner of plate tracery. The space above the jib, enclosed by the principal rafter and queen-post, is similarly filled. There is no horizontal cross-strut in this roof, but in the central part a stilted arch rises from the ends of the jibs between the queens, and combines with the principal rafters, which latter abut at the top upon a thick wedge-shaped block like a keystone. These blocks support the moulded ridge, and over it the common rafters are framed and pinned. This is a more than ordinarily elaborate design, and as no horizontal line crosses the church between floor and ridge, the effect is eminently light and lofty. Not very dissimilar is the roof of S. Stephen's, Norwich. In some instances, as at Outwell Church, Norfolk, the spur and wall-post are omitted, and the jib serves as a corbel. In other cases the jib is dispensed with, and the spur brought into prominence, as at Brinton Church, where, with no special attention to elegance, the utmost appearance of spaciousness is secured. At S. Mary, Pulham, the general design, the mouldings, and carved enrichments all display artistic ability and grace.

The bracket principle, though dignified under simple treatment, is very susceptible of embellishment, and was found so generally convenient and effective as to induce its very frequent employment. Advance may be perceived from the severe forms of utility to decorative construction, and thence to constructed ornament, by which fiction ultimately surmounted truth. One set of brackets was made to rise above another, as at the Inner Temple Hall, London, and Bacton Church,

Norfolk. But the fullest development of this rich and complicated mode is met with at Knapton—a nave of the unusual width of 30ft. Carvings of angels with wide-spread wings, flowers, and ornaments are freely introduced, and colour is so boldly applied as to present a striking and florid effect rarely approached elsewhere. Smith's mute record is full of secular examples, while Messrs. Brandon have principally resorted to parish churches, and have admirably represented the Knapton specimen. (The value of their book would have been much enhanced had they furnished dates.) The hall of Wadham College (1613) is exquisitely rendered by Mackenzie and Le Keux in Ingram's "Memorials of Oxford." The roof in the Inner Temple will, I think, be found well drawn in "Weale's Quarterly Papers."

CHURCH AND CHAPEL BUILDING IN THE WEST.

EXETER.—S. Sidwell's parish church is to undergo great changes and improvements. The principal alteration will be in the chancel, which is to be much enlarged. The organ will be removed from the gallery and placed in the chancel, and open benches will take the place of the old pews. The restorations will take place under the care and from the designs of Mr. Ashworth, architect.

S. MARY'S STEPS CHURCH.—A report upon the state of the ancient tower of this interesting little church has been prepared by Mr. Ashworth, architect, and it has been decided to restore the same in accordance with the plans suggested by that gentleman. The shabby coat of plaster which now covers the upper part of the tower will be removed, the stonework dressed and repointed, and there will be a new battlement, parapet, &c. Inside, the archway over the doorway will be strengthened and improved in appearance. Tenders are to be invited for the execution of the work.

TOWNSTALL CHURCH, near Dartmouth, Devon, has fallen into a sad state of decay, and a meeting has lately been held for the purpose of considering what steps should be taken for putting it in a proper state of repair; and for removing from it that appearance of neglect which is too perceptible throughout the whole building. It is proposed to commence the work as soon as funds permit. The Council of the borough, as owners of the tithe rent-charge, are responsible for the repairs of the chancel, and there is a little property, consisting chiefly of houses vested in trustees, which is applicable to the maintenance of the church. The amount, however, derived from this source after payment of all expenses is barely sufficient for the most pressing repairs.

S. JULIOT, CORNWALL.—The parish church of this little hamlet, situated near Boscastle, is to be entirely rebuilt. The materials used will be principally the local polyphant and granite. Messrs. H. and R. L. Badcock are the architects.

LAUNCESTON, CORNWALL.—The new Wesleyan Chapel, now erecting from the designs of Messrs. Norman and Hine, bids fair to outrival all Dissenting places of worship in the south-west of England, both for size and the great convenience of the internal arrangements. The chapel, which has a front elevation of 40ft. to the top of the gable, is being built of local freestone, with Bath stone dressings from the Corsham quarries to windows and stringcourses, and is to have a spire 108ft. in height, built of Bath stone, with Plymouth limestone dressings. The extreme inside length of the chapel is 80ft., and the width of the nave and aisles 45ft., with two transepts projecting 18ft. behind. It is entered from a central porch, supported by polished Aberdeen granite pillars surmounted with boldly carved conventional capitals in Portland stone. The open seating and pulpit are to be of pitch pine, stained and varnished, and the aisles are to be laid with Maw's encaustic tiles. The school rooms adjoin the chapel, and have separate class rooms attached. The contract price for the chapel, including spire, schools, &c., amounts to about £3000. The whole of the ornamental stone carving, which is a description of freely treated Romanesque, is being executed by Mr. Hems, of Exeter. Mr. H. Blatchford is the builder, M.J. Blatchford being foreman of works.

J. V.

PATENT VICTORIA STONE.

WE have waited the result of an experiment made within our own knowledge, on the merits of the "Patent Victoria Stone," before recording, as we do now, our favourable opinion. There is no doubt that for paving purposes it is quite equal, if not superior, to Yorkshire flagstone; while there is a difference in the cost of the material of at least 50 per cent. in favour of the Patent Stone. Its use is, however, by no means confined to paving purposes. It can be used for any purpose either of utility or ornament in which stone could be employed; and as it can be made in different colours, the variety of natural stone can be imitated with good results.

The stone is formed of granite and hydraulic cement, steeped by a patent process in a solution of flint, which makes it nearly as hard as granite itself; and in process of time it becomes harder and harder. Thus a slab of the concrete, 2 feet broad and 2 inches thick, resting loosely on supports 2 feet apart, will bear, in about 10 days' time, an average of about 700lbs. weight in the middle. After being steeped in the flint bath, it will sustain about 1050; in about 5 months' time about 1700lbs.; and in nine months' as much as 2400lbs. This great increase of strength is attributable to the gradual hardening, by time, of the flint, which is at first thrown down in a state resembling jelly. The crushing strength, as certified by Mr. Kirkaldy, is 6441lbs. per square inch. Thus a block or brick of the patent stone, presenting a surface about 6 by 9 inches, sustained a weight of nearly 160 tons, or the weight of 80 coal carts full of coals heaped one upon another; and a foundation of the Patent Victoria Stone could sustain a solid tower of stone about 6441 feet in height.

The material is already in very extensive use, and will, we think, continue in favour with architects. We have almost lost all faith in "speculative" builders, or we would point out to them that here is a material with which they can erect desirable and *saleable* houses at a cost not exceeding the wretched bricks they have for some years past been piling up in heaps in all our suburban districts.

PAPER-HANGING.

WE would urge the necessity, from a sanitary point of view, of having the walls of a room thoroughly stripped of all old paper and washed and dried before laying on a new paper. Old papers, containing as they do a large amount of vegetable and animal matter in the form of size, are easily softened by moisture, and are then subject to putrefaction and mildew, the odour from which is both unpleasant and unhealthy. This, however, is an evil that can easily be averted by expending a few dollars in stripping and thoroughly cleaning the wall before each re-papering. Inquiry is often made by the careful housewife as to whether paperhangings will clean, and, if so, which is the best method to adopt. Good hand-printed paper will clean, but machine-made paper, owing to the material used in sizing the colours, as already explained, will not. The following is the best method that can be used:—Cut into four or six parts a moderately sized loaf of bread that is two days old—it must be neither newer nor staler. With one of these pieces, after blowing off all the dust from the paper to be cleaned, with a good pair of bellows, begin at the top of the room, holding with the crust in the hand and wisping lightly downwards with the crumb, about half a yard at each stroke, till the upper part of the hanging is completely cleaned all around. Then go around again, with a light sweeping stroke downwards, and always commencing each successive course a little higher than the upper stroke had extended, till the bottom is finished. This operation, if carefully performed, will frequently make very old paper look almost equal to new. Great caution must be used not by any means to rub the paper hard, or to attempt cleaning it in a lateral or horizontal way. The dirty part of the bread, too, must each time be cut away, and the pieces renewed as soon as it may become necessary.—*American Builder.*

Mr. Armitage is about to continue the decoration of the hall in University College, London. The new pictures will contain portraits of living personages who are also interested in the College.

Furniture & Decoration.

ON THE USE AND ABUSE OF ORNAMENT AND COLOUR IN THEIR APPLICATION TO HOUSE DECORATION.

IT should be known, but seems not to be regarded by many of our decorators, that there are two classes of colours, namely, advancing colours—that is, colours which bring out the members or parts of a cornice on which they are placed much more prominently than if they were left to the simple effect of light and shade—and another class of colour which appears to retire or to sink back. It will be evident that the proper use of these two classes of colours or tints of colour will tend to assist the constructive features of the object on which they are placed, and it may be taken as a fundamental rule in colour decoration that all colouring should assist construction as well as produce harmony; and in colouring a cornice to a room or any other surface which is enriched by ornament or mouldings in relief, we commit a grave error, and help to destroy the constructive feature of the cornice, if we place retiring colours on projecting mouldings or ornament, and advancing colour into the quirks, backgrounds, and interstices; yet this is continually done by those who ought to know better. But if we reverse this order of things, and place the colour which recedes into the coves, quirks and backgrounds, and the advancing colours, upon the projecting members, we shall by that means increase the apparent depth of the sunk parts, and also the projection of the prominent parts; and however slight the contrast of colour may be, each member of the cornice will be now clearly defined and traced. These colours are also often misplaced in the colouring of public rooms. How often do we see the projecting stile round large panels, tinted grey, or some other receding colour, while the panel which is sunk will be tinted faun colour or buff—thus destroying and altering the relative positions of the two, to the manifest injury of both. This mistake is also made in the painting of woodwork in party colours, a white panel and a grey stile, which always ought to be the reverse, as thereby the relative position of both are retained, and the door will appear of more importance.

Advancing colours are composed of all tints, hues, and shades of colour in which yellow forms the prominent feature, such as cream colour, buffs of various shades, mixtures of yellow and red and white, and yellow and red, with green to take off its brightness, and white—yellow, red, and umber and white—yellow, red and black, and white. It will be understood as a matter of course that hundreds of shades and tints of colour may be made from the above combination of colours. The purer and brighter the colours are the more prominent they will appear, so that by a judicious variation of the tone or intensity of each colour or tint, each member of a cornice may be kept in its proper place and position.

Retiring or receding colours consist of all combinations in which blue predominates, such as blues and greys, blue in its various combinations with red and black, puce, lilac, violet, murrey, and blue green, and the innumerable tints made with these colours in mixture with white. Red, being the most prominent colour we have, can seldom be used on moulded surfaces, or upon backgrounds, except its intensity is to some degree toned down with either blue or black, and therefore it is only safe to use it on the undersides of square fillets or other surfaces. Yet we often see it used in its primitive state for the background of ornament, and in the interstices of enriched ornament, but whenever it is so used it will be found to destroy both form and harmony. The same result will follow if we paint our mouldings blue or green, and it may be accepted as a fundamental law, inseparable from complete harmony, that any colour or ornament which

on entering a room is seen in a prominent manner before the eye has had time to take in the whole effect of the decorations is wrong in principle and objectionable in fact, inasmuch as it destroys that feeling of repose which is an essential quality and portion of perfect harmony of colour and form.

Variety of treatment is indispensable. A dining-room of moderate dimensions should be decorated in a different manner to a large banqueting hall in a public building or nobleman's mansion. In the former case the ceiling and cornice may be as richly coloured and gilt as may be consistent with good taste, having regard to its size and height; but its walls should be painted of some quiet warm neutral colour, to form an appropriate background to display the rich dresses of the company and the garniture of the sideboards and tables when set out; but in a large banqueting hall, or large dining-room specially constructed for entertaining numerous guests, the architectural features of the walls and ceiling are so different to the ordinary dining-room of middle-class domestic life, and of which phase of decorative art we are more particularly treating, that it would require a special article to do it justice. There are several modes of treating the walls of dining-rooms when painted. A tone of murrey colour is a good warm colour for the purpose, and if it has a pattern stencilled upon it in the same colour, but of a somewhat darker shade, it will add to its richness, without detracting from its quietness. The murrey colour is made from Indian red, black and white. Another good colour for the purpose is a neutral green, made from Indian red, burnt sienna, and black, with white of course. There are several other tints of a suitable kind, which we have described elsewhere. The woodwork, as a rule, cannot be of a more appropriate colour than oak, either the real wood or imitation, especially if the furniture is oak. Plain walnut panels and oak stiles are also good; and here it may be observed that it is always in good taste to paint the woodwork of a dining-room in imitation of the same wood as the furniture is made of.

A good style of doing the woodwork of a dining-room is to paint it in low-toned colours —that is, dark neutral tints of golden browns, bronze greens, olive tints, or olive and brown, with stencil ornaments on the panels, either in black and gold, or in monotones—tones of the same colour, either lighter or darker than the ground. The darker colours stencil best, as it is always difficult to get a solid body of colour in stencilling a light colour on a darker one. If the panel is of a warm yellow brown, the lines or ornament may be deep blue or black. If the ground colour is chocolate, light blue or pea-green lines may be used. If the ground be maroon, deep blue or warm green lines will harmonise. There are of course many other combinations of colour which would be appropriate and harmonious, too numerous to be mentioned here. In using the above style of decoration we would caution the tyro against sundry errors he is likely to fall into from bad examples he may see, and which errors cannot be too strongly condemned: the first of which is the practice of putting ornaments on the sides of a door next the moulding. What it is done for we have no conception, but we do know that it is bad in practice, and tends to destroy the structural features of the door, and never in any case does it add any beauty to it. Another prevalent error is to paint broad heavy mouldings on door and architrave, some black, dark brown, blue, or green. It is always better to paint a moulding of the lightest colour of two or three which may be used on the door.

A moulding to a panel should never be of a darker shade than the panel colour, except in wood—such as ebony mouldings to oak panels and stiles, &c. A moulding may always be relieved, either by a line of gold or of light colour, but with dark heavy mouldings the result is always heaviness and consequent ugliness. Another fault we are apt to fall into is lininess or stripiness, if we may be allowed the term, and it is always well to avoid this, which can only be done by having perfect harmony of colour. It does not follow, because green harmonises with red, that any shade of green will harmonise with any shade of red. This is not so. Both require to be modified to suit each other before perfect harmony will follow; but if they do harmonise, we do not perceive that stripiness so much as we otherwise should. In the Scotch plaids or tartans, for instance, we have the most objectionable form of lines possible—a succession of straight lines crossing each other, forming squares or chequered patterns; but we don't perceive the objection, simply because the lines blend one into another in crossing, and thus get rid of all harshness, and produce a certain degree of harmony which is pleasing to the eye. Again, if we examine an Indian shawl, we shall find that all the primary colours are used in their full intensity—bright yellows, brilliant reds, intense blues, blacks, browns and greens of every shade and hue—the whole producing an exceedingly rich but quiet combination of colours of great beauty. No one colour stands out before the rest, but all is harmony and peace. We say peace advisedly, because it is an indisputable fact that the effect of colour on the human mind, or rather on the nervous system, and upon inferior animals, is either soothing or irritating, as the case may be. As to its effect on the lower animals, we need only instance the effect of red upon the bull, the turkey, and goose. Its effects on the human animal is not quite so marked, but we are firmly convinced that it affects his happiness and comfort to a much greater degree than is generally supposed. For instance, paterfamilias goes home tired and wearied from his daily toil in the City, leaving bills and shares, and discounts, with all the worry and trials of business, behind him, hoping to feel comfortable and at ease under his own—well, we will say—gas light—as vines and fig trees are scarce. When seated at home he cannot tell how it is, but he does not feel that sense of rest and comfort he expected. He can't think how it is. He has every comfort around him—a pleasant wife, lovely children, the dinner is all right, wine first-rate, all jolly, as it should be—but, no, it won't do. With all this he is still uncomfortable, an indescribable feeling of annoyance pervades his being—something must be wrong somewhere; his digestion is all right, it can't be that! What can it be? At last it strikes him that it must be that beastly paper he had put on in the autumn, and he recollects that he has never felt happy in the room since—that must be the cause. He therefore resolves to change it. This time he makes choice of one of those quiet, unobtrusive patterns we have before spoken of, and the result is like a magical transformation. He at once feels comfortable, and really at home in the room. No more bad temper, no more discomfort. He looks forward to the cosy seat at his own fireside with pleasurable anticipations, and he is not disappointed. His wife and children feel the change and rejoice, and thus happiness is spread around by good taste. Don't imagine that this is an over-drawn picture, for there are none of us but have felt the same effects in some degree. It is quite true that some persons are more sensitive to its influence than others; but we all are conscious that there are some rooms, which, on entering, impress us with a strong sense of their comfort and cosiness, while others give one a cold shivering feel, which depresses us, and makes one feel out of place. This being so, we may perceive how important it is to avoid discordant and inappropriate colours in the decoration of a room, as they tend to produce a feeling of discomfort and annoyance, dazzle the eye, and produce headaches. We were once staying at an hotel in which there was a room papered with what is called a mediæval pattern, the principal colours being blue and red. There certainly was a little yellow in it, but the other two had such a preponderance that the effect on the nervous system was distressing to everybody who sat in the room. If we looked at it for ever so short a time our eyes were dazzled, and we soon had headache, and we verily believe that if we had stayed in it we should soon have had brain fever. This effect was not produced on us alone, but everyone who sat in it was affected more or less.

SCHOOL OF ART.

The Sidney Gallery of Art.—On Tuesday evening week, the presentation of prizes to students at this gallery, which has been established in Canterbury as a School of Art by Mr. Cooper, took place; the Dean of Canterbury presiding. The first prize was a pencil etching by Mr. Sidney Cooper, cows and sheep, the recipient of it being Mr. Caldwell, jun.; the second prize was money (£1 10s.) to Mr. Bond; and the third (£1) to Mr. Jones. These prizes were for drawings from the antique (a colossal statue of a Greek orator, in the gallery). There was one other competition, in which Mr. Salisbury was successful, whose work was highly commended. The second class was for female students, and Miss Crippen received the first prize, which was a beautiful drawing of sheep by Mr. Cooper; Miss Elsmore took the second prize; and Miss Hogben the third. The third class was for landscapes, each student sending six, being copies of Mr. Cooper's pencil sketches. Miss Bewsher was awarded the first prize, another etching of sheep by the celebrated artist; and Miss E. Croasdill gained the second prize. After the prizes had been presented, the rev. chairman addressed a few remarks to the company, eulogising Mr. Cooper for his having established and maintained this School of Art. Mr. Butler Johnstone then congratulated the students and the inhabitants generally upon having such an institution in their midst, and said they all owed Mr. Cooper a deep debt of gratitude for his public spirit.

ARCHITECTURAL AND ARCHÆOLOGICAL SOCIETY.

London and Middlesex Archæological Society.—The ordinary evening meeting was held on Monday last, at University College, Gower-street. Mr. H. F. Holt continued his paper upon "Early Albums;" Mr. J. W. Baily exhibited Roman antiquities recently found in London; and a collection of silver coins discovered at Harmondsworth, Middlesex, was exhibited and described by Mr. Alfred White, F.S.A.

COMPETITION.

Bradford Church Literary Institute.—Messrs. Milnes and France, Messrs. Andrews, Son, and Pepper, Mr. Gay, and Mr. Stead Ellis, architects, have been invited to send in designs for the utilising of the old premises, which have been acquired by the committee, and the building of the proposed extensions and additions to the present structure. These designs were sent in yesterday.

Utilisation of Sewage.—We often hear of "death in the pot" or in the water we drink, but it appears, says the *Parochial Critic*, that at Bethnal Green it is to be found in the roads. It will be remembered that it was clearly proved, a few weeks ago, that a child had died in consequence of the offensive smell arising from sewer deposit being spread on the roadway. Nor is that all. The surveyor stated that the sewer deposit is used for binding broken granite on roads newly covered, after the soluble matter has been drawn off. That is to say, the scourings of the roads are washed into the sewers allowed, to remain in those dark, pestiferous subterranean caverns for a few years, and then brought to the surface for road-making. Truly in London everything is utilised.

The New Forest.—The 60,000 acres of waste lands in the New Forest, belonging to the Crown, produce an annual income of about 6d. per acre Mr. Fuller, the eminent land-agent, considers that, if properly managed, and sold in detail, they would realise £6,000,000 sterling.

Building Intelligence.

CHURCHES AND CHAPELS.

ACTON.—The memorial stone of a new Congregational Chapel at Acton was laid on the 9th inst. The building, which will be of Gothic design, when completed will seat on the ground floor 500 people. The estimated cost is about £4500.

BATTERSEA.—The foundation stone of a new Baptist Chapel at Battersea was laid on the site of the old building in York-road on Wednesday week. The building will be of the Romanesque style, composed of white brick, white stone dressings and cornices, and is estimated to hold 900 persons. Mr. E. C. Robins is the architect.

BELPER. — The old Independent chapel at Belper is about to be pulled down, and a new chapel reared in its place, at a cost of £3000. The style of the new building will be Gothic, with a tower and spire, and accommodation will be provided for a congregation of 500 persons. Mr. Woodhouse, of Bolton, is the architect.

CAMBRIDGE.—A new church, dedicated to S. Barnabas, and situate on the Mill-road, was opened for public worship on Saturday last. The edifice, which only consists, at present, of a chancel, capable of holding about 200 persons, has cost about £1100 ; when entirely completed it will cost £5000. Mr. Bury, of London, is the architect, and Mr. Attack, of Cambridge, the contractor.

COEDYGRIC, MONMOUTHSHIRE.—On Thursday, the 9th June, the foundation stone of a Wesleyan chapel was laid by Mr. R. Greenway, of Pontypool. The chapel is being carried out from designs and under the supervision of E. A. Lansdowne, architect, Newport. The builder being Mr. T. S. Thomas, Newport.

DARLINGTON.—On Saturday afternoon, the foundation-stone of a new church to replace a temporary one built some years ago for S. Paul's parish by Messrs. W. and R. Thompson, was laid at Darlington by Mr. W. Thompson. The new church is in the midst of an increasing population, surrounding the ironworks at the northern part of the town. Mr. W. P. Pritchett, of Darlington, is the architect of the new church, which is to cost about £4000. The building is in the Early Decorated style, and will accommodate about 600 worshippers.

DARLINGTON.—The foundation stone of a new Baptist chapel at Darlington was laid on Thursday week by Mr. J. B. Pease. The chapel, which will be Italian in style, will seat 600 persons, and will be erected from a design by Mr. W. Peachey, architect, of Darlington.

DEVONSHIRE-SQUARE CHAPEL.—On Monday evening last, a farewell meeting was held at this ancient place of worship. The chapel having been purchased by the Metropolitan Railway Company, the trustees have secured a good site for the new building at the corner of the Walford-road, nearly opposite West Hackney Church. They have about £11,000 to expend on the ground and the new structure, which is to be of the Gothic order, with a spire 110 feet high. Devonshire-square Chapel was founded in the reign of Charles I., and prior to A.D. 1638. It is, therefore, with the exception of Eythorne, Kent, the oldest Baptist church in England.

FALLOWFIELD.—The corner stone of the Church of Holy Innocents, Fallowfield, Lancashire, was laid on the afternoon of the 4th inst., with full Masonic ceremonial. The site of the new church is on the north side of the new road leading from Fallowfield to Chorlton, and adjoins the Didsbury High-road. Space is provided for the erection of schools and a parsonage. The church will comprise a nave 89ft. by 25ft., internally divided into five bays of 17ft. wide each, and about 62ft. high from the ground to the ridge of the roof. On each side of the nave will be aisles 13ft. wide. The chancel will measure 38ft. by 22ft., and will open into a side chapel or aisle. The exterior will be executed *en pierre point*, with stone dressings to windows, &c., and the window tracery will be of Berlin red terra-cotta. The main internal columns and arches will be worked in red Runcorn stone, with white stone for caps and bases. Accommodation will be provided for about 700 persons. The architects are Messrs. Price and Linklater, and the builders, Messrs. Ellis and Hinchliffe.

FRANKTON.—The ancient church of Frankton, Warwickshire, is to be restored as soon as the necessary amount (£1200) can be raised.

FRYERNING.—S. Mary's Church, Fryerning, Essex, was re-opened on Thursday week, after having been closed for twelve months for restoration and repairs. The plaster has been stripped from the outer walls, thus exposing to view the fine old conglomerate walls of the Norman period. New open roofs of oak, covered with tiles, have been erected. The base of the front has been restored, and a new reredos erected. A new oak porch has been built in lieu of the very dilapidated old structure. The organ has been rebuilt and removed from the west gallery to the north side of the nave at the west end, by Mr. Rust, of Chelmsford. The general works have been carried out by Messrs. Brown and Son, under the direction of Mr. F. Chancellor, architect, of Chelmsford. The total cost of the restorations is about £1400.

GLASGOW.—A new church in the east end for the United Presbyterians was formally opened on Sunday last. Bellgrove-street, in which it is built, is in the new suburb of Dennistoun, in the immediate neighbourhood of the Alexandra Park. The architects are the Messrs. Ingram, of Glasgow, the building is Gothic in style, its cost is £3000, and it accommodates about seven hundred persons.

HANDSWORTH. — On Wednesday week the parish church of Handsworth, near Sheffield, was re-opened, the chancel having undergone thorough restoration. The walls of the chancel have been partially rebuilt; single lancets have been inserted in the south wall, the eastern windows having been carefully repaired. The ancient sedilia and piscina have likewise been brought to light and restored. The north wall has been repaired; but the most important feature internally is the new chancel arch of hewn stone having bowtell columns with moulded capitals and bases sustaining a narrow pointed arch of low and massive style of two orders, chamfered and moulded—the whole details having been studied from the tower arch of the church. The floors of the chancel and chantry have been lowered two feet and relaid with encaustic tiles, and the old monumental slabs on a bed of concrete. Externally the walls and stonework have been carefully repaired and pointed, and the gable copings renewed and surmounted with floriated crosses. In the north wall of the chantry two new windows have been inserted, with new buttresses and parapet, and the wall partially rebuilt. These, with the new roof, are designed in the Perpendicular style, to which this part of the church belongs. The works have been executed by local contractors from the designs of Messrs. M. E. Hadfield and Son, of Sheffield.

LEAMINGTON.—A new Wesleyan Chapel wa opened at Leamington last week. It is in th Italian style, and is in accordance with a design prepared by Mr. George Woodhouse, C.E., architect, Bolton-le-Moors. Mr. W. Green, Clarendon-street, Leamington, was the contractor, and Mr. W. Paterson, of Manchester, clerk of the works. The external dimensions are 91ft. by 60ft.

MIDDLE CLAYDON.—The parish church of Middle Claydon, having been completely restored, was re-opened on Whitsun Day. The exterior has been completely restored, Dalton stone being used in the repairs. The tower and the chancel are of the Perpendicular style of architecture, the latter having been built in 1519. An entirely new vestry and lobby have been built on the south side of the chancel, like the tower and chancel, in the Perpendicular style. The old gallery has been taken down, and also the ringing floor, a new one having been put over the western arch. The old roof of the nave has been taken down, and a new oak panel one has taken its place. The altar and its accessories are all new. The reredos is of alabaster, by Messrs. Farmer and Briadley, London. The centre portion is divided into three subjects—the middle one being the Ascension, that on the left the Resurrection, and that on the right the Descent of the Holy Spirit. The work has been superintended by Mr. George Hannaford, under the directions and from the designs of George Gilbert Scott, Esq., R.A. The builders are Messrs. Franklin, of Deddington.

MIDDLEWICH.—The corner stone of a new Congregational Church was laid at Middlewich, Cheshire, on Thursday week. The chapel, which is Lombardic in style, will be constructed of best stock bricks, with Hollington stone dressings, and will seat about 380 persons. The cost will be £2000.

ROCHESTER CATHEDRAL.—The appointment of Dr. Scott to the deanery of Rochester will, it is believed, lead to the restoration and renovation of this cathedral at no distant date. For many years past the funds from the suppressed canonries of the cathedral have been accumulating in the hands of the Ecclesiastical Commissioners, and these now amount to between £30,000 and £40,000. A strong hope is now expressed that the accumulated funds will be expended in improving the cathedral, both internally and externally, and rendering it worthy of taking its rank as the finest specimen of Norman architecture in this country. The removal of the old block of houses on the south side of High-street has opened up a fine view of the north-eastern portion of the cathedral, which, until recently, was altogether hidden from sight. In any alterations which may be carried into effect a further improvement will, it is hoped, be carried out by still further throwing open this partially enclosed space, and making a road to the eastern end of the cathedral from High-street.

ROME.—The church of S. Antonio de Portoghesi, Rome, has just been restored under the direction of the Cavaliere Francesco Vespignani, the Pontifical architect. This church, says a correspondent, has always been conspicuous for the beautiful Portuguese marbles with which it is adorned, but the rich colours of these have seemed to require that the painting and gilding of the new stucco work should be somewhat louder in tone than would be otherwise commendable. The new frescoes have been executed by Francesco Grande and Salvatore Nobili.

SOUTHBOROUGH, NEAR TUNBRIDGE WELLS.—On Tuesday, the 24th May, the foundation stone of this church was laid by the Rev. Stephen H. Langston, M.A., Vicar. The church is designed to accommodate 600 persons, the style is Early Decorated Gothic, the walls being constructed of the local stone in random courses with Bath stone dressings. The roof is to be open timbered, covered with tiles. Owing to the exposed site and the porous nature of the stone, it has been found necessary to adopt unusual precautions to prevent the weather penetrating, and to attain this end, all the walls are built hollow, with a clear space of 3½ n. between the stone outer work and the ½in. brick inner lining, properly bonded with drip cramps. To overcome the difficulty of the wet penetrating over the openings, a kind of gutter is formed of cement "in the cavity" over the crown of relieving arches, proper precaution being taken to provide outlets for the moisture and thorough ventilation throughout. The plan is arranged so that the church may be built in sections without necessitating any alteration. The contract for the first section, to accommodate 300 persons, has been taken by Messrs. Willicomb and Oakley, of Tunbridge Wells, at a cost of £1660. The architect is Mr. Theodore Green, of Finsbury-place.

SOUTHAMPTON.—The ceremony of consecrating the newly-erected church of S. Matthew was performed on Saturday morning last by the Bishop of Winchester. The builders are Messrs. Bull and Son, of Southampton ; the architects, Messrs. Bull and Mondey. The building has been raised, at a cost of about £3000, in the Norman style, the exterior being of Swanage stone, with Bath stone dressings and slate roof. Accommodation is provided for 500 persons, and this will be considerably increased when the funds will admit of the church being completed by the addition of the north aisle. It now consists of a nave, south aisle, chancel aisle, or organ chamber, and chancel, with semi-circular apse. The nave arches and columns are of a very substantial character, and are executed in Bath stone, with tastefully moulded capitals and bases. The flooring is in encaustic tiles ; that in the chancel and apse, of a rich description, was presented by the Architectural Pottery Company, of Poole.

BUILDINGS.

BOWLING CHURCH SCHOOLS.—The vicar of S. John's Church, Bowling, Yorks, finding that the old school was inadequate for the wants of his district, has obtained a neat Gothic design from Messrs. T. H. and F. Healey, architects, Bradford, for new and more capacious school buildings, to accommodate 400 infants, girls, and boys. The schools will be one story in height, with a southern aspect, and consist of infants' room, 48ft. by 19ft. ; girls' room, 48ft. 6in. by 19ft. ; and boys' room, 56ft. by 19ft. ; each of the schoolrooms being 18ft. 6in. in height to the ceiling, and provision is made for class rooms. Externally the schools will be constructed of stone, relieved with gables, filled in with circular-headed windows ; and the other windows are shown with stone mullions and transoms. The founda-

tion-stone of the school is to be laid on the 28th inst.

CEYLON.—The foundation stone of the new public markets and municipal offices, Colombo, was laid on April 22 last, by H.R.H. the Duke of Edinburgh, in the presence of a large number of spectators. The buildings will consist of two detached blocks, one 200ft. by 60ft. running parallel with the face of the site, and the other, 170ft. by 80ft., at right angles to it in the rear. The central portion of the former will contain the offices of the municipality, with a double row of shops on each side covered with iron roofs. The rear block, which is to be used as a public market, will be entirely of iron. The buildings generally will be of an ornamental character, and a lofty clock tower is to form a prominent feature. The buildings have been designed by Mr. James G. Smither, Government architect, under whose directions the work is to be carried out.

EASTWOOD.—The corner stone of a new Church of England school at Eastwood, near Rotherham, w as laid on Thursday week. The building, which will cost about £600, is being erected from a design by Mr. Blackmoor, architect, of Rotherham.

HALIFAX, YORKSHIRE.—The new schools for boys in connection with Holy Trinity Church, and which are situate in West Parade, are now bringing the first half-year of their career to a satisfactory close. The style of building is of the Early Pointed period, carried out with the strictest regard to modern requirements and economy, great attention being paid to obtain proper ventilation and light. The school is situated on the west side of the site, containing a spacious school-room, class, and cloak-rooms on the first floor, to accommodate 150 scholars, the ground floor being used, for the present, as a covered play ground, with a prospect of eventually being used as a school also. The roof of the school is supported by pointed arched principals. The walls are lined with red, black, and white facing bricks set to pattern. The schoolmaster's house is situate on the east side of the ground, the principal play ground lying between it and the school. The whole of the exterior walls are faced with outside delf-dressed local stone, walled in courses, relieved with cleansed and moulded ashlar work. The works have been carried out from the design, and under the superintendence of Messrs. Horsfall, Wardle, and Patchett, architects, of Halifax.

TAUNTON.—On Tuesday the new building, which has been erected for the Independent College, Taunton, was opened. The present arrangements provide for the reception of 150 boarders, but admit of extension for the accommodation of 200. The style is Tudor-Gothic; the building is of West Leigh stone, with Bath stone facings. In the grounds are covered playground, gymnasium, tennis-court, and bathing-place. The cost of the land was £5760 4s. 7d; the contract for building, £10,500; and the drainage, ventilation, architect's fees, clerk of works, &c., bring the total cost to nearly £20,000. The architect was Mr. Joseph James, London; and the builder, Mr. Henry Davis, Taunton.

TO CORRESPONDENTS.

We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

RECEIVED.—P. A.—J. V.—W. Y.—T. S.—J. G. S.—T. M. and Co.—J. and W.—R. M. T.—J. S.—H. Masters, J. H. T.—W. B.—H. H.

J. ELTRINGHAM.—Sketch of church.
T. GARRATT.—Your sketch will appear in a week or two.
A. ELLIS.—With photo and description of S. Mary, Aberdeen.
W. S.—With MS. to folio 120.
J. A. POPPET.—With sketch of screen. Returned.

Correspondence.

IMITATIONS OF WOOD AND MARBLE.

(To the Editor of THE BUILDING NEWS.)

SIR,—Your correspondent "J. R. W." says that I evidently don't understand the drift of the passage I quoted from Ruskin in my article on Woods and Marbles, and that for lack of better weapons I have pelted him (Ruskin) with dirt. Now I have neither time nor inclination to enter into a controversy on the subject, but I wish to say, once for all, that there is no man living who has a higher respect or a greater love for John Ruskin's writings than I, and I feel glad of this opportunity of acknowledging how much I am indebted to him for many of my past and present thoughts and feelings on art matters, and I again and again return to his invaluable teachings with renewed pleasure and profit; but, however much I admire and reverence Mr. Ruskin, I cannot accept all that he says as true and uncontradictable—practical experience and common sense forbid!

Having said thus much in order to rebut the charge of throwing dirt at Mr. Ruskin, I may now say a few words in answer to "J. R. W." In the first place I would ask him to be consistent before he sets up as a Mentor. He is evidently one of the compromisers spoken of in the article referred to. He says, "Practically, there are some imitations which, on his own principles, escape Mr. Ruskin's censure. Wainscot imitation well varnished is a durable and economical decoration." What authority he has for crediting Mr. Ruskin with such a contradiction I cannot conceive, for if there is one quality more conspicuous than another in Ruskin's writings, it is the principle of thoroughness and consistency, and it is this very feeling which at times leads him to ignore the practical; therefore I feel assured that the assumption is a gratuitous one on the part of "J. R. W.;" its inconsistency is evident. Imitations of woods and marbles are legitimate aids to decorative art, or they are not. The fact of them being well varnished does not affect the question at all; from Ruskin's point of view they are abominable and not to be used, so they are held to be from your correspondent's point of view; but he unduly thinks some may be used. I confess I have no respect or sympathy for trimmers, and must therefore leave the facts to speak for themselves. "J. R. W." then goes on to give instances he has seen of a room—grained walnut, which was injured by the window cord; another in which an abortive attempt had been made to imitate bird's-eye maple, &c., &c. It is evident he has not been fortunate in his experience of imitations, and if he will refer to my article he will find that I only speak of good and faithful imitations, and not one word is said in favour of bad work—such as he speaks about. I hold the principle to apply to ornaments as wel as imitations, that if you cannot have it well done don't have it at all, but substitute something you can have well done—plain colour is preferable to ornament badly designed and executed, or to poor imitations. Again "J. R. W." says "as for ceiling decoration there is no structural necessity for plaster cornices at all." This is a very lame argument against their use. The bricklayer's labourer is quite as well aware of that fact as your correspondent. The ceiling is not even supposed to be supported by the cornice nor meant to be. The ornamental features of any building are not intended nor supposed to be necessary to its support, but I think no one will question their necessity as a means of decoration, therefore his argument falls to the ground for want of support. He seems to imagine that I deprecate the use of ornament; if he does he is mistaken. I certainly object to every wall, door, ceiling, column, and pilaster throughout a house being bedaubed with ornament, however well executed, to the utter destruction of all quietness and repose. In this, as in other things, we are too apt to run into extremes. Let us have ornament in its place, and woods and marbles also. The one is a pleasant relief and contrast to the other.

Your other correspondent, who signs himself "W. T. F.," blames me for expressing so decided an opinion upon the passage quoted from Mr. Ruskin's writing, to which I can only reply that Mr. Ruskin set me the example, and I could have no nobler or better one. John Ruskin is not the man to clothe his ideas in silken garments, if he is speaking of anything he considers wrong. I therefore make no apology for using the words "arrant nonsense" when I consider such utterances to be so. "W. T. F." falls into the same error as your first correspondent. He speaks of fancy marble and imitations of impossible woods. Now the whole tenor of my articles is in favour of honest work, and I condemn such work as he speaks of as strongly as he does. It is this carelessness of workmanship and want of thoroughness in doing what we have to do to the best of our skill and ability which has brought these things into such bad repute. My sole aim in these articles is an endeavour to bring about a more earnest desire and practice of better and truer work. . . . "W. T. F." goes on to argue that stained wood is infinitely superior to painted work, that it is healthier for the workmen, and that the using of paint makes a man lazy. Why it should make a man lazy I am at a loss to conceive. A personal experience of nigh upon forty years amongst paint and painters does not point to that conclusion. He asks, Why should we cover up good and naturally grained wood? I don't say it should be covered up. Good and naturally grained wood is certainly beautiful, but bad wood, though natural, is not beautiful, but ugly. I say, if we use pitch pine or oak, then we have a good and legitimate an article; but if "W. F. T." knows anything of the trade, he will know that even pitch pine has to be picked wood if it is to be used and finished in stain and varnish, and this fact enhances the price so much that in many cases it brings it up as dear as oak; and, if I am not mistaken, some choice specimens much dearer. The practical effect of this is to limit its use, and inferior wood is used instead. Ordinary deal or white pine has scarcely grain to speak of, and what it has is straight up and down, without any curl. Any beauty it has I have failed so far to discover. Your correspondent concludes by saying that there are peculiar riches for each and every class. Here I am strongly at issue with him. A thing of beauty cannot be too widely distributed, and should be as much the property of the poorest of God's creatures as the richest. It does not matter how it is brought about, whether by plaster-casts, by castings in iron, bronze, or other metal, whether it is multiplied by the aid of machinery, by engraving, by photography, or by any other means, so that the original is faithfully rendered, and its influence be as much spread as possible. Let the poorest of the poor feel it as well as those men favoured by fortune. Good must result therefrom. Away with the thought that beauty is only for those who can afford it. Beauty and goodness belong to no class exclusively. All of us are made better and worse and happier through its influence. Its effect in bringing out the best feelings of our nature may be seen in any picture gallery to which the poor have access. Then let us hear no more of confining art to class, but let us multiply its influence by all the means in our power, until it becomes universally felt.

W. S.

ORNAMENT AND COLOUR IN HOUSE DECORATION.

SIR,—In your journal of the 10th inst. there is an article "On the Use and Abuse of Ornament and Colour in its application to House Decoration." With the general scope and argument of the paper I have no quarrel, and only write to notice a single sentence, where the writer has used an expression, doubtless in a comparative sense, which, understood literally, might convey an idea not strictly intended. The sentence alluded to is, "The grass, and trees, and flowers, and all pure greens, look fresher and brighter by contrast with it."

Now, if we are to credit one writer at least on the landscape painter's art, a *pure green* cannot be exactly matched by any natural leaf or blade of grass. The green in natural foliage is all mixed; qualified by reds, and browns, or other tints, in various proportions or combinations, and perhaps a large amount of neutral tint will be found diffused through every landscape, the distance sometimes being almost entirely of that tint.

As in settling principles we must be guided by facts, it is desirable to get as clear an insight into these as possible; and to assist any student of art in this direction, in whatever degree, by stating anything I may happen to have met with, and to remember, is the sole purpose in this note.

—I am, Sir, &c.,
GEORGE MARTIN.

Stockton-on-Tees, June 15, 1870.

WRYNESS IN ARCHITECTURE THE STYLE OF THE PERIOD.

SIR,—Many modern instances of design show a marked effort to repudiate the adage of Ben Jonson's days, which says—

"By *line* and *rule* lives many a fool."

Yet the wisdom may be called in question that reproduces the outline of old unfinished or decayed designs such as are now set up all over the land. Is it for moonshine effect that our would-be baronial villas and streets have so many nondescript towers and turrets so helplessly copied and stuck to,

with tumble-down effect, as if some after-thought or blunder, which puzzles one now to make out. Future antiquarians may say—

"The towers in different ages rose,
Their various architecture shows
The builders' various hands."—MARMION.

Since the romance in stone and lime was built at Abbotsford, my conscience! what a host there has been of retrogressive romantic imitations! Even the lath and plaster features of old Edinburgh are being reproduced in costly stone, in a poor locality, without reference to present fitness. Surely the beauty and taste of mediæval design are poorly copied in our lop-sided churches, with the taper spire that points to heaven put in any corner that chance or whim may dictate, and that with other distortions is seen in buildings dedicated to the all-perfect Creator!

It may be that some irregular sites require some awkward arrangements; but it strikes me as a curious circumstance, to hear and see all our petty Protestant denominations squaring up their puny ideas, and never striving to unite in singing the songs of Zion from one hymn-book; yet all make an effort to build their churches with the heavenward spire put one side. If such is perfection and beauty in churches built to please the priest, they remind one of the story of the hunchback, who, after a friar preaching on God's works being all-perfect, asked what could be said of him? "Why," said the friar, "you are a perfect hunchback."—Yours, &c., J. K.

Intercommunication.

QUESTIONS.

[1871.]—ARCHITECTS' CHARGES.— Can any of your correspondents kindly inform me whether it is customary for architects to receive from contractors carrying out works under their superintendence a commission of 2½ per cent. in addition to the usual 5 per cent. received from their employers? I have just discovered such an arrangement to exist between the architect and the contractor now conducting works for which I am to pay, and the former of these gentlemen assures me that in London it is a usual and recognised practice. There appears to me something bad in principle in this, and I should be glad to be informed if it be really true.—VICTIM.

[1872.]—SEMICIRCULAR ARCH.—When a semicircular arch of same thickness as pier supports a superincumbent weight, at what point will it yield supposing the piers to remain perfectly firm and plumb? Does the arch exert a kicking or thrusting-out force on piers?—X. Y. Z.

[1873.]—CEMENT FOR RESISTING FIRE.—I shall be obliged if one of your readers will inform me through Intercommunication what is the beft known cement to resist the action of fire, and where it can be procured, and also what is the best sort of stone to use for hearthstone to avoid cracking and shelling?—GEORGE SEELEY.

[1874.]—GLASS DRAWING BOARD.—I came across the description, some time back, of a glass drawing board to facilitate making tracings. I intend to construct one, but cannot now refer to the description. Can any reader tell me how it is managed?—ONE OF US.

[1875.]—GRANITE IN ARCHITECTURAL DRAWINGS.—I have seen a close imitation of granite in colouring architectural drawings which I fail to accomplish by any ordinary means. How do your other readers manage?—FRITZ.

[1876.]—PLAN ARRANGEMENT OF STAIRS.—Would some one kindly, through "Intercommunication," state the rule adopted by architects for showing on plan the arrangement of stairs? Do dotted lines represent the flight coming up or the flight overhead? In the case of starting from ground floor, where there is no basement, should any dotted lines appear on plan? I have heard the subject frequently discussed, but at the end each kept his own opinion still.—X. Y. Z.

[1877.]—GOTHIC MOULDING.—Can any of your readers inform me whether there is any particular house where the building trade resort to for Gothic moulding? All the books of patterns that I have obtained have reference to housebuilding, and not fancy work. I want to choose some to cover a ceiling with in the Elizabethan or Gothic style—viz., ribs, &c.—A SUBSCRIBER FOR TEN YEARS.

[1878.]—CARD MODELLING.—Having read your articles on cardboard modelling, in the month of December, 1867, can any of your readers tell me of a book, the price of it, and explaining it more fully? If so, I should be much obliged.—INQUIRER.

REPLY.

[1866.]—CLEANING GRANITE ASHLAR.—Let "W. M. M." wash over his ashlar front stone by stone with strong muriatic acid (spirit of salt) and immediately thereafter scrub well with a rough brush and clean water, taking care not to expose the stone too long to the action of the acid, which by going into the mica would produce a dirty green appearance, and thereby mar the good effect of it.—J. M.

STATUES, MEMORIALS, &c.

THE NEW PARIS OPERA HOUSE.—Of the five groups in bronze which are destined to decorate the exterior of the new Opera House, Paris, two are now completely gilt, and will soon be displayed. These groups, placed at the angles of the façade, have been executed from designs from M. Gumery; they represent, one, "Lyric Poetry and the Muses," the other "Lyric Poetry accompanied by Fames." The other groups which surmount the new Opera House are "Apollo," by M. Aimé Millett, and the two figures of "Pegasus," by M. Lequesne, which respectively crown the central gable and the extremities of the great wall of the stage, or rather that which surmounts the proscenium within, at the line between the stage and the auditorium.

BUILDING SOCIETIES.

IMPARTIAL PERMANENT BUILDING SOCIETY.—On Thursday week the annual meeting of this society was held in the office, 280, Whitechapel-road. The eighth annual report recommends the declaration of a bonus of 15s. per share, in lieu of only 8s. last year; and the directors state that, had they been able to have lent out as much money this year as last, the bonus would have been proportionately increased.

ALLIANCE (SHEFFIELD) PERMANENT BUILDING SOCIETY.—The first annual meeting of this society was held on Monday evening, in the Cutlers' Hall. From the report and financial statement read by the secretary, it appears that a fair amount of business has been transacted during the past year at a very trifling expenditure, and that, after paying 5 per cent. interest to all holders of completed shares, there remains a balance of £435 to be carried forward towards the triennial division of profits to be made in 1872.

WATER SUPPLY AND SANITARY MATTERS.

The matter of the Merthyr Tydvil Drainage came before the Court of Chancery on Friday last, in the form of an appeal by the Board against the decision of Vice-Chancellor Romilly, who sequestrated the rates, in consequence of the Board neglecting to comply with an order of the Court to discontinue draining the town sewage into the river. The Court, after hearing lengthy arguments, adjourned.

THE CORPORATION OF LEEDS AND THE SEWAGE.—The appeal by the Leeds Corporation against the recent injunction of Vice-Chancellor James, on the subject of the sewage of the borough, came before the Lord Chancellor and Lord-Justice Gifford on Thursday week. Their Lordships held that whatever privilege was conferred by the 107th clause of the Leeds Improvement Act, under which the power to pass the sewage into the river was claimed), must necessarily be subject to the clause against the committal of a nuisance. The judgment of the Vice-Chancellor was therefore confirmed with costs, including the costs of affidavits not produced on the hearing of the motion. The Court also declined to suspend the injunction, and the Corporation therefore will be compelled at once to take measures for disposing of the sewage by other means than those at present in existence.

BIRMINGHAM.—Mr. Arthur Hassard, who, it will be remembered, devised the scheme of the present water supply of Dublin, has submitted to the town of Birmingham a plan for an improved water supply. The new scheme promises an immediate supply of 22,000,000 gallons daily, collected from streams at a distance of fifty miles, and conducted to Birmingham by gravitation. Beyond this vastly extended supply the projector holds out a promise of a double supply, available without much further trouble, and he speculates upon the enormous yield of over 70,000,000 gallons daily, by a further extension of the collecting ground. The position of Birmingham renders it impossible to get a large and constant supply of water by gravitation, without going a long distance for it. The nearest distance which fulfils Mr. Hassard's conditions is to be found in the Radnorshire hills. His plan is to take the water from the River Teme, at about five miles from the town of Knighton. The collecting ground covers an area of 36 square miles, measuring 23,000 acres, and varying in height from 750 to 1800ft. above the sea level. The district consists of mountain and hill pasture, is of slate formation, free from peat and other nuisances, and yielding a pure supply of water, calculated as giving a net yield of 27,000,000 gallons daily. For a further supply Mr. Hassard proposes to go to the gathering ground of the River Ithon, an immediately adjoining district, embracing an area of about 36 square miles, varying in height from 900 to 1900ft., and capable of yielding a net supply of 30,000,000 gallons daily. If even this should be thought insufficient, Mr. Hassard points to a third source, further westward, and on a still higher level—namely, the upper drainage of the River Wye, which he estimates as capable of yielding another 15,000,000 gallons daily. Supposing the whole scheme to be entertained, not less than a daily supply of 72,000,000 gallons of water might be rendered available for the use of Birmingham and the Midland district. For the present, however, Mr. Hassard proposes that the Teme alone shall be used, and that provision shall be made for a daily supply of 22,500,000 gallons of water; part of the structural works being so arranged that the supply may be increased to 45,000,000 gallons daily, at comparatively small additional outlay. He estimates the total cost of a supply of 22,500,000 gallons of water daily (with a possible increase to double that amount) at something like £1,600,000, including the purchase of the existing waterworks.

POTABLE WATER.—The general result of the investigations of Dr. Frankland and the Government Water Commission amounts (says the *British Medical Journal*), when analysed, to a denial of the current notion that sewer water, mixed with the stream of a river, is purified by the combustive action of the oxygen dissolved in the water. He maintains, on the contrary, that there is no river in England long enough to effect this combustion completely and satisfactorily. It is true that, after a short distance, the river water becomes limpid, and less loaded with organic matter, but that is because the greater part of the organic matter in suspension has fallen to the bottom, and is deposited with the mud. The source of infection has merely changed its time and place. The spores which are capable of transmitting disease resist both modes of separation. To purify sewer water, the Commission sees no other practicable means than filtration through the earth, which it serves to manure and enrich. This filtration completely purifies it, and without danger of infectious emanations arising from the land, as might be feared.

LEGAL.

DISTRESSING RAILWAY FIXTURES.—The case of Turnor *v.* Cameron (Q. B., 18, *Weekly Reporter*, 544) decides that the iron rails and sleepers on a railway cannot be distrained for rent. The question was, "whether the rails and sleepers forming the railway under consideration continued to be personal chattels, or whether, by reason of their annexation to the freehold, they became fixtures." It was found in the case that the railways in question were private railways, made for the better enjoyment of some collieries, and were so far permanent that they were intended to remain on the premises, as auxiliary to the working of the mines, until, at least, the expiration of the term for which the mines were let. The only difficulty in the case was one of fact and law. There is seldom any dispute as to the definition of fixtures; but the question usually is, whether particular articles have or have not become fixtures. This decision has now settled the question as to lines of railways.—*Solicitors' Journal.*

Our Office Table.

NEWTON ABBOTT, DEVON.—The Art and Industrial Exhibition, held at Philadelphia Hall, which closed on the 8th inst., has been attended with unexceptionable success. The collection in the industrial section included beautiful samples from the Watcombe Terra Cotta Company, and the Bovy Pottery Company, whilst Mrs. Treadwin, of Exeter, sent some most exquisite samples of delicate and intricate lace work. In the art department there were some clever sketch models in plaster, by Mr. Hems, of Exeter, and that gentleman exhibited a series of photographic specimens of his carvings in wood and stone, all of them showing much power in design and execution. Mr. Widgery was the largest exhibitor of paintings, his picture of the "Cuckoo" being awarded the silver medal. It is exceeding fine, displaying not only the artist's well known freedom and vigour, but being finished with such exceeding care and minute accuracy that—the ferry foreground especially—it invites and will repay the closest inspection. Mr. Foot, of Ashburton, was represented by some faithful views of the Dart. Mr. Williams and Mr. Whitaker contributed some paintings of interesting local scenery. The photographic display by Mr. Bradnee and Mr. Croft was very good. There was a large collection of works by School of Art pupils; they were, however, of little interest. The attractions of the exhibition were supplemented by lectures and concerts each evening.

RAILWAY EXTENSION AT TREDEGAR.—The contract for the making of the line between Merthyr and Rhymney has been taken by Messrs. Brassey and Field; and Mr. McCullock, who constructed the line from Sirhowy to Nantybwch, as sub-contractor for Messrs. Brassey, has commenced operations. This will be the last connecting link in the way of railway accommodation for Tredegar and every town of importance on the hills.

MOVING A WINDMILL SIXTEEN MILES.—A novel experiment, not quite so sensational as the moving of an hotel at Chicago, but yet something quite out of the ordinary way, has been the removal of a wind flour-mill, with all its fittings, from Westacre to Clenchwarton, Norfolk, a distance of about sixteen miles. The mill was a wooden structure, and, with its machinery of enormous weight, stood upon wheels, having been purchased by a man living at Clenchwarton, he determined to endeavour to draw it along the road by a traction engine, but all efforts to find one strong enough proved ineffectual; the application, however, of a powerful steam cultivation engine proved more successful. In passing along the road various expedients had to be tried, such as in ascending a hill the engine proceeded to the summit, and then pulled the mill up with a chain, and so carefully had the task to be performed that it occupied three days to make the journey. In crossing the Great Eastern Railway at Walton, the telegraph wires were broken. In attempting to cross the Ouse it was feared that the celebrated long bridge would not be strong enough to bear the enormous weight, but the engine having first passed over, the mill itself was drawn over, the timbers of the bridge in the meantime creaking, and showing that a very severe test was being put upon its powers. At first it was feared that the bridge had been broken, but this was found not to be so. Its arrival at Clenchwarton was received with quite a demonstration.

EXETER CATHEDRAL.—In an article on Exeter, the *Saturday Review* says:—Every one who goes to Exeter can hardly fail to examine what at first sight seems to be the only subject of interest in the place, while of the early history of the city and the traces which it has left behind it a guide is eminently needed. As in some other episcopal towns, Canterbury and Winchester, for instance, the Episcopal Church derives additional importance from the extraordinary poverty of the parish churches. There is no parallel in Exeter to the great parish churches of Bristol, Wells, and Norwich. Of the Cathedral itself the strange and unique outline is well known. No western towers, no central lantern, but two side towers forming transepts, which have been irreverently likened to paddle boxes, and which are repeated again at Ottery S. Mary. But the absence of a central tower or lantern of any kind allows the existence of what is probably the longest continuous vaulted roof in the world. It is hard to judge of its effect as it is now sadly broken by the organ stuck on

the rood-loft. This at once brings us to the question of re-arrangement, which at Exeter is certainly more difficult than in some other places. The stalls are wretched, but the rood-screen is solid, ancient, and very beautiful, and we could hardly find it in our hearts to destroy it. But we are not at all clear it would not be possible to turn it into an open screen without destroying its effect. Exeter could then be as well arranged as Lichfield or Hereford. Failing this, it might be best boldy to cut the church asunder, Dunster-wise, to place an altar outside the screen, to use the nave on Sundays, as is partially done at present, and to keep the choir as a chapel for daily service. Anyhow, the present ungraceful fittings of the choir must be swept away, and the monstrous proposal of throwing the choir aisles into it must not be thought of.

THE DEMOLITION OF CITY CHURCHES.—Mr. J. S. Burn, writing to *Notes and Queries*, says that when S. Christopher's church was pulled down in order to make way for the Bank of England, a copy was made of all the inscriptions and deposited in the Heralds' College. He adds that about 1846 this copy was admitted as the only evidence of a fact deciding the title to a freehold property in Blackfriars. It is to be hoped that similar precautions will be taken now that other City churches are about to be demolished.

BRICKS FROM GAS COAL ASHES.—According to the American *Gaslight Journal*, walls of remarkable lightness, porosity, and dryness may be built cheaply of bricks made from the ashes of the coke derived from gas-works. Mr. Wagner, the first inventor of the process for effecting this, gives the following as his *modus operandi*:—"The ashes, after being taken from the retort, are spread on the surface of a clean floor; they are then finely pulverised, and 10 per cent. of slacked lime, together with a small proportion of water, is intimately stirred and incorporated with them. After a rest of 24 hours, the mixture is made into bricks by the ordinary process. These bricks are immediately transferred to the drying sheds, where a few days' exposure renders them fit for use."

Chips.

The Cologne Victoria Theatre, which has replaced that destroyed by fire some time ago, was opened last week.

Professor Capellini has published, at Bologna, an account of the last International Congress of Prehistoric Archæology held last year at Copenhagen.

By way of memorial to the late Bishop of Exeter, it is proposed to add a tower to S. Mary's Church, in the cathedral city of the diocese.

A new Wesleyan chapel is to be built at Noss, near Plymouth. Messrs. Ambrose and Snell have prepared the designs.

A person who was once a gardener is now practising in Yorkshire as an architect, in which profession he obtains as many engagements as he can fulfil. The same individual has a pride in saying that he reckons "nowt" about the five orders of architecs (*sic*), and would not give a "toss" for a man who was unable to put something new in every job he got.

The Holborn Board of Guardians is negotiating for a loan of £14,000, in order to enlarge S. Luke's workhouse.

On Saturday afternoon last, during a strong wind, the roof of the new Primitive Methodist Chapel, on the Anlaby-road, Hull, was blown off.

It is proposed to erect a drinking fountain on the Market-hill, Bedford, at a cost of £160. The design of the fountain is by Mr. Usher, architect, Bedford.

The parish church of Milton Ernest, Beds, has recently been re-opened after restoration.

The first stone of the new Tower-hill Roman Catholic Industrial and Poor Schools will be laid on Tuesday afternoon next by the Princess Marguerite of Orleans.

The Italian Minister of Public Works states that the tunnelling of Mount Cenis will be accomplished by the end of next year.

The Merrybent and Darlington Railway was opened last week. The works were designed by and executed under the direction of Messrs. Nimmo & Mackay, Mr. Quelch being the resident engineer.

The memorial stone of a new church, dedicated to S. Mary, was laid at Bayham, Herts, on Tuesday week. Mr. Harris is the builder.

A new Baptist chapel was opened at Woodditton, Suffolk, on Thursday week.

It has been decided to restore Christchurch Cathedral.

Messrs. Hill, of London, have received instructions to rebuild the cathedral organ at Peterborough.

The next meeting of the Masonic Archæological Institute takes place on the 30th inst., when a paper will be read "On the Phœnician Masons' Marks at Jerusalem."

The Exhibition of Ecclesiastical Art at Rome closed on the 31st ult.

The *Giornale di Roma* announces that Signor Costa, the engineer who has the concession of the Ostian Canal, has commenced operations, and has already traced it out to a length of ten kilometres.

Two and a-half acres of land at Stoke Newington, just sold for £2200 per acre, were purchased by the late proprietor, during the present century, at about £100 per acre.

Mr. Frank Caws, architect, has submitted to the Sunderland Trade and Commerce Committee plans for an improvement scheme for Sunderland.

Trade News.

TENDERS.

BRIDLINGTON QUAY, YORKSHIRE.—For the erection of new billiard club rooms, on the Promenade. Mr. Alfred Crouch, architect. Architect's estimate (excluding plumber's work and fittings), £300:—

Bricklayers, Plasterers, and Slaters.

Birkett	£231 12 6
Rennard	225 0 0
Petch and Fox	208 15 0
Harrison, Walkington, and Gray (accepted)	179 0 0

Carpenters and Joiners.

Vetch and Fox	£143 11
Colley	120 0
Purden (accepted)	117 0
Mainprize	115 15

BROMLEY.—For alterations and additions to Bromley Workhouse, at Locksbottom, Bromley, Kent, for the Guardians of Bromley Union. Wm. Lee, Esq., architect. Quantities supplied by Messrs. Linsdell and Giffard:—

Marsden	£5600
Emmett	5469
Garrett	4848
Dayne and Co.	4838
Crabb and Vaughan	4800
Arnaud	4796
Gill	4729
Henshaw	4583
Hill, Keddell, and Waldram (accepted)	4510
Tollitt	4477

CAMBRIDGE.—For the erection of chapel at March, Cambridge. Mr. John Usher, architect:—

Cunvin	£2839 0
Nightingale	2620 0
Broadhurst	2741 10
Hutchinson	2225 0

CAMBRIDGE.—For the erection of Corn Exchange. Mr. W. J. Bowyer, architect:—

Bardell and Son	£6300
Feist and Waters	5368
Thoday	5200
Hailey	5073
Nightingale	4729
Bell and Sons	4415
Loveday	4375
Elworthy	4325

COLCHESTER.—For alterations and additions at the Essex County Gaol, Colchester:—

Adamson	£5726
Munday	5500
Capon	5300
Grimes	5039
Wells	4700
Brown	4650
Runnacles	4547
Parmenter	4515
Saunders (accepted)	4430

HAMPSTEAD.—For rebuilding house and shop, No. 29, High-street, Hampstead, for Mrs. Barnes. Mr. F. C. Dyer, architect:—

Hill and Sons	£1424
Scrivener and White	1298
Manley and Rogers	1277

ISLINGTON.—For gas fittings at the new Islington Workhouse. Mr. Burden, architect:—

Faraday and Co. (accepted)	£556

KENSAL GREEN.—For the erection of a farm house and homestead at Kensal-green for Mr. Hinckman. Mr. Robert Hutchinson, architect, Huntingdon:—

Nutt and Co.	£3050 0
Bunting and Saint	2994 10
Meville	2928 0
Wicks	2850 0
Dowel	2745 0
Harrison and Sons	2710 0
Blease	2693 0
T. and R. Whitaker	2635 10
Wiles	2550 0
Thackray	2500 0
Dover and Co.	2499 0
Parsons and Telling	2499 0
Snowball	2495 0
Wicks, Bangs and Co.	2490 0
Salter	2375 0
Thompson and Smith	2277 0
Bowler and Baxter	2139 0

LEAVESDEN.—For joinery, fittings, and fixtures at the S. Pancras Schools, Leavesden, for the S. Pancras Board of Guardians:—

J. F. Barber and Co. (accepted)	£457 16

LEAVESDEN.—For boundary oak fencing at the S. Pancras Schools, Leavesden, for the S. Pancras Board of Guardians:—

Hewetson (accepted)	£190 16 9

LEAVESDEN.—For forming roads, &c., at the S. Pancras Schools, Leavesden, for the S. Pancras Board of Guardians:—

Young (accepted)	£740

LONDON.—For the erection of schools at Belle Isle, Camden road. Mr. E. M. Whitaker, architect. Quantities supplied by Mr. L. C. Riddett:—

R. E. Roberts	1494
Williams	1465
Higgs	1462
Bridgman and Nuthall	1450
Scrivener and White	1335

MAIDSTONE.—For the erection of offices for the Clerk o the Peace for Kent. Mr. Martin Bulmer, architect. Quantities by Mr. G. Ruck:—

Schofield	£1540 6 3
Smith	1281 14 0
Naylar	1087 0 0
Anscomb	1045 0 0
Vaughan	1022 0 0
Avard and Abnett	1015 0 0
Bridge	998 0 3
Sollitt	990 0 0
Wallis and Clements (accepted)	980 0 0

OXFORDSHIRE.—For the erection of residence and stables at Bendicote, near Banbury, Oxfordshire. Thos. M. Lockwood, architect:—

Dover and Cox	£5781
Nightingale	5678
Franken and Sons	5255
Munday	5194
Aldridge	4830
Davis	4573
Kimbuley	4498
F. and S. Orchard (accepted)	4399
C. Palmer	3973

PUTNEY.—For house, stabling, and greenhouse, for J. Bangham, Esq., of Lime-villa, Putney. Mr. C. H. Goode, architect:—

Crabb and Vaughan	£1745
Aries	1704
Sutton	1665
Avis	1594
Wigmore	1575
Adamson	1565
Stocks and Tidy	1525

PUTNEY.—For a house at Putney, for John Langham. Mr. Charles H. Goode, Surveyor:—

Adamson and Sons (accepted)	£1565

SOUTHALL.—For erection of nursery, &c., at St. Marylebone schools, Southall. Mr. H. Saxon Snell, architect. Quantities supplied:

Nightingale	£1363
Bamford and Son	1320
Manley and Rogers	1320
Hanson	1319
Gibson Brothers	1274
Crabb and Vaughan	1213
Howard (accepted)	1189

S. LUKE'S.—For new mortuary for the S. Luke's Vestry:—

Brown and Son	£500
Palmer and Co.	354
Perry, Bros.	315
Sabey and Son (accepted)	283

S. ALBANS.—For the erection of stabling, coachhouse, &c., at St. Albans, Herts, for Thos. Paget, Esq. Henry Jarvis and Son, architects:—

Tarrant	£1681
Miskin	1487
Thompson	1480
Henshaw	1447
Shepherd	1445
Gammon and Son	1385
Richardson	1159

SURREY.—For erecting schools at Merton, Surrey, for the trustees of the Thornton Charity. Messrs. Aldridge and Willis, architects. Quantities by Mr. D. Cubitt Nichols and Mr. L. C. Riddett:—

Gammon and Sons	£2740
(Reduced to £2550, and accepted.)	

TEDDINGTON.—For surface (pipe) drainage, Teddington. Thomas Goodchild, surveyor. Quantities supplied:—

Agate	£909 7 4
Cole	526 2 0
Brown	512 3 0
Standen	510 0 0
Pizzey	465 0 0
Voss	457 10 10
Blackmore	445 0 0
Keeble	419 0 0
Young	401 10 0
Goodair	390 10 0
Bloomfield (accepted)	388 0 0

TOTTENHAM.—For the erection of house, Lansdowne-road Tottenham. Mr. T. E. Munday, architect:—

Clayton	£865 0
Chapman	770 0
Linzell	719 0
Sheer	695 0
Hamlin	684 0
Webb	675 0
Nightingale	672 0
Maeers	666 0
Humphreys and Son	650 0
Garrud	649 0
Wicks, Bangs, and Co.	637 0
Harrison and Edwards	620 0
Bowler and Baxter	590 10
Best and Brown	577 0
Niblett and Son	550 0
Whittaker	549 10
Hoare and Cleland (late)	535 0

WHITEFRIARS.—For works at Grand Junction-street, Whitefriars. Mr. A. Peebles, architect:—

Hill and Sons	£2576
G. Myers and Sons	2415
Barnett	2240
Adamson and Sons	2226
Ramsey	2215
Fish	2190
Manley and Rogers	2158
Sawyer	2100
Nightingale	2063
Patman and Fotheringham	1988
Foster	1942
Ennor	1896

THE HYDE, KINGSBURY.—For the erection of farm house and outbuildings at the Hyde, Kingsbury, for Mr. Aitkins. Mr. Robert Hutchinson, architect, Huntingdon:—

Blease	£1709 0
Wicks, Bang, and Co.	1680 0
Wiles	1599 0
Wicks	1548 0
Nutt and Co.	1500 0
Dowel	1490 0
Harrison and Son	1478 0
Meville	1470 0
Salter	1450 0
Doune	1398 10
Thackray	1395 0
Dover and Co.	1393 5
Willett	1392 0
Thompson and Smith	1327 0
Snowball	1292 0
Parsons and Telling	1249 0
Bowler and Baxter	1185 10

CONTRACTS OPEN FOR BUILDING ESTIMATES.

FALMOUTH.—UNITED DISTRICT SEWERAGE WORKS, June 21.—Contract No. 1.—For providing and laying about 5000 yards of best glazed stoneware socket pipe sewers, from 9in. to 12in. in diameter; also the necessary junctions, cleansing pipes, syphons, sand tanks, gulleys, sewer ventilators, &c. Contract No. 2.—Providing and laying about 2500 yards of best glazed stoneware socket pipe sewers, from 9in. to 21in. in diameter; also the necessary junctions, cleansing pipes, syphons, sand tanks, gulleys, sewer ventilators, &c.—Wm. Warn, Clerk, Falmouth United District Sewerage Board Office.

NEWCASTLE-UPON-TYNE, June 20.—For the erection of new schools in Bath-lane, Newcastle-upon-Tyne. Thomas Oliver, F.R.I.B.A., architect, Newcastle-upon-Tyne.

CROYDON, June 21.—For enlarging ths church of St. Andrew. Rev. D. Long, St. Andrew's Vicarage, Croydon.

ROCHESTER, June 27.—For the erection of a new corn exchange at the city of Rochester, on a piece of ground in the rear of and adjoining to the present Corn Exchange. Richd. Prall, Town Clerk, Rochester.

WIGAN NEW INFIRMARY, July 1.—For the erection of the proposed new infirmary for Wigan and the district. Richard Lea, hon. sec., Wigan.

HUDDERSFIELD, June 30.—For the erection of a first portion of a block of buildings comprising shops, warehouses, &c., for Sir J. W. Ramsden, Bart. W. H. Crossland, F.R.I.B.A., 25, Park-square, Leeds, and 4, Regent-street, S.W.

DUBLIN PORT AND DOCKS BOARD, June 29.—For taking up and rebuilding a portion of the north wall quay, for a length of about 1832ft., with works connected therewith. N. Proud, Secretary, Dublin Port and Docks Office.

METROPOLITAN BOARD OF WORKS, June 27.—For the erection of a fire brigade station in Ladbroke-road, Nottinghill. John Pollard, Clerk of the Board, Spring-gardens, S.W.

BRISTOL LOCAL BOARD OF HEALTH, June 21.—For constructing, with cast-iron railings, cantilevers and mouldings, a wrought-iron girder bridge, at or near Park-street, Bristol. John G. Heaven, clerk.

CAWOOD, NEAR SELBY, June 21.—For the forming of a footpath, about 800 yards in length. W. H. Nicholson, and Thomas Thomlinson, Surveyors, Cawood.

LEEDS, June 30.—For the erection of two villa residences. Ridley King, architects, 24, Park-square, Leeds.

LEEDS. June 20.—For the erection of six good houses, in Virginia-road, Mount Preston. Wilson and Bailey, architects, Central Market-buildings, Leeds.

LEEDS, June 25.—For the erection of a dwelling house in Bellevue-road. Wm. Wilks, architect, 9, East Parade, Leeds.

MALDON, June 20.—For the erection of a new bridge (to be built principally of brick) over Heybridge Creek of the river Blackwater, at Maldon, Essex. G. W. Digby, Town Clerk, Maldon.

LANCASHIRE AND YORKSHIRE RAILWAY, June 28.—For the erection of four cottages, at Bacup; also, for alteration at Moses Gate Station. Wm. S. Lawn, Secretary, Manchester.

LIVERPOOL CENTRAL STATION RAILWAY, July 13.—For the construction of the above railway and works. Edward Ross, Secretary, Secretary's Office, London-road Station, Manchester.

HEDINGHAM HIGHWAY BOARD, July 4.—For the paving of the footways on each side of Ballingdon-street. Robert F. Stedman, Clerk to the Board, Sudbury, Suffolk.

HULL, June 29.—New Wesleyan chapel and schools, Coltman-street, For the erection of the above-named buildings. William Botterill, architect, 23, Parliament-street, Hull.

JOINT COUNTIES LUNATIC ASYLUM AT CARMARTHEN, July 2.—For the execution and completion of the following works, viz.:—1st. For the erection of two new wings, one for male and the other for female patients; 2nd. For sundry repairs to the roofs and other parts of the existing buildings. Charles Henry Hughes, Clerk, Quay-street, Carmarthen.

WORCESTER COUNTY AND CITY PAUPER LUNATIC ASYLUM, June 24.—For the erection of a new wing to accommodate 134 male patients. Martin Curtler, Clerk to the Visitors, Worcester.

NEW TOWN HALL, ROCHDALE, June 27.—For the oak joinery and fittings necessary for the completion of the building. Zach. Mellor, Town Clerk.

LEEDS, BOAR-LANE, June 29.—Lot 8.—For the erection of the above works for Messrs. Goodall and Backhouse. William Bakewell, architect, Leeds and Halifax.

REIGATE, July 1.—For the erection of a master's residence and the building of a new school room. John Lees, architect, Reigate, Surrey.

BROMLEY LOCAL BOARD, June 20.—For the supply of about 4000 yards of glazed stoneware pipes, varing from 6in. to 15in. in diameter. Robinson Latter, Clerk to the Local Board, Bromley, Kent.

BURFORD, July 1.—RESTORATION OF THE CHURCH.—For the draining of the church and churchyard, and the warming of the church. William Scarlett Price, Honorary Secretary, Burford, Oxon.

ASHTON KEYNES, WILTS, June 25.—For the erection of new schools, teacher's residence, &c., in the above parish. Lansdown and Shopland, architects, &c., Swindon.

GLOUCESTER, June 27.—For the erection of a new chapel, day rooms, and other buildings. Mr. Medland, the county surveyor, Clarence-street, Gloucester.

LONDON, July 19.—ANCIENT ORDER OF FORESTERS.—For the performance of certain works required in the erection of the intended Foresters' Hall, at Wilderness-row, Goswell-street, S. Luke's. Jno. McTernan, Secretary, Ancient Order of Foresters, L.U.D. Offices, 16, Essex-street.

LATEST PRICES OF MATERIALS USED IN CONSTRUCTION.

TIMBER.

	£ s.	£ s.		£ s.	£ s.
Teak ..... load	12 10	13 0	Finland	6 10	8 0
Quebec, red pine	3 15	4 15	Memel	7 0	9 0
,, yellow pine..	4 0	5 0	Gothenburg, yellow	8 0	9 10
St. John, N.B. yellow	0 0	0 0	,, white ..	7 10	8 0
Quebec oak	5 15	6 10	Gefle, yellow	9 0	10 10
,, birch	3 15	4 10	Soderham	8 0	9 10
,, elm	4 5	5 5	Christiania, per C., 12 ft. by 3 by 9 in yellow	10 10	12 10
Dantzic oak	4 5	6 5	Flooring Boards, per sq. of 1in., first yel.	7 6	10 6
,, fir	2 5	4 0	First white	7 0	9 6
Memel fir	2 10	3 15	Second qualities	6 0	7 6
Riga	2 15	3 2	PUMICE STONE per tn	6 0	8 0
Swedish	2 0	2 13	OILS, &c.		
Masts, Queb. red pine	3 10	5 10	Seal, pale .. per tun	38 0	0 0
,, yellow pine ..	3 10	5 10	Sperm body	90 0	0 0
Lathwood, Dant. fm.	4 0	5 0	Cod	41 0	0 0
,, St P'burg.	5 10	6 10	Whale, Sth Sea, pale	37 10	0 0
Deals, pr C., 12ft by 3 by 9 in.			Olive, Gallipoli.....	52 0	0 0
Quebec, white spruce	12 10	17 10	Cocoanut, Cochin, tun	45 0	0 0
St. John, white spruce	12 10	14 0	Palm, fine	39 10	0 0
Yellow pine, per reduced C.			Linseed	31 5	31 10
Canada, 1st quality..	18 0	19 0	Rapeseed, Eng. pale..	45 10	46 0
2nd do.....	12 0	13 0	Cottonseed	30 0	35 10
Archangel, yellow ..	11 0	12 10			
St. Petersburg, yel...	11 0	12 10			

METALS.

LEAD:—

Pig, Foreign ..... per ton	17 12	6	17 15	0	
,, English, W.B. ..... do.	19 5	0	0 0	0	
,, Lead Co. ..... do.	18 12	6	18 15	0	
,, Other brands ..... do.	18 0	0	18 2	6	
Sheet Milled ..... do.	18 10	0	0 0	0	
Shot, Patent ..... do.	21 0	0	0 0	0	
Red or minium ..... do.	19 15	0	20 0	0	
Litharge, WB ..... do.	0 0	0	0 0	0	
White dry ..... do.	25 10	0	30 0	0	
,, ground in oil ..... do.	0 0	0	0 0	0	

COPPER:—

British—cake and ingot ..... per ton	70 10	0	71 0	0	
Best Selected ..... do.	72 0	0	0 0	0	
Sheet ..... do.	74 10	0	76 0	0	
Bottoms ..... do.	78 0	0	0 0	0	
Australian ..... do.	73 0	0	75 0	0	
Spanish Cake	0 0	0	0 0	0	
Chili Bars ..... cash	67 10	0	68 10	0	
,, refined ingot	71 0	0	72 10	0	
el. Metal Sheathing & Rods ..... per lb.	0 0	6½	0 0	6¾	

BATH STONE OF BEST QUALITY.

RANDELL, SAUNDERS, AND COMPANY, LIMITED, Quarrymen and Stone Merchants, Bath. List of Prices at the Quarries and Depôts; also Cost for Transit to any part of the United Kingdom, furnished on application to

BATH STONE OFFICE,
Corsham, Wilts.

[ADVT.]

BANKRUPTS.

TO SURRENDER IN THE COUNTRY.

John Wooley, Farningham, Kent, builder, June 22, at 11.30.

ACT 1869.—PUBLIC EXAMINATIONS.

W. Bennett, Queen's-road, Peckham, brick and lime dealer, July 4—W. Deuman, Lower Norwood, builder, July 7—F. J. Head, Eastbourne, engineer, June 27—J. P. Baragwanath, Upper Thames-street and Rydon-crescent, Clerkenwell, engineer, July 7—H. Stapley, Tunbridge Wells, architect, July 14—J. Down, Mere, Wilts, blacksmith, June 27—W. Winstanley and J. Formby, Liverpool, engineers, June 27—T. Thomas Ystrad, Glamorganshire, builder, July 13.

DECLARATION OF DIVIDENDS.

G. Berney, Belgrave-street and Totton-street, Stepney, timber dealer, div. 8s. 7½d.—J. Richardson, Liverpool, timber merchant, div. 2¾d.

DIVIDEND MEETINGS.

J. R. Ward, March's-place, Putney, builder, July 2—W. T. Cowper, Manchester, joiner and builder, June 21—E. J. Sowter, Derby, timber merchant, June 28.

PARTNERSHIPS DISSOLVED.

Clift and Francom, Holloway, builders—Wright and James, Bedford-row, Gray's-inn, architects—Slocombe and Son, New Wandsworth, carpenters—Kedward and Hawes, Amherst-road, West Hackney, builders—Midgley and Jowett, Bradford, plumbers—Burrs and Sharp, Gracechurch-street, metal and timber merchants.

Important Freehold Building Site, within a few yards of the intended additions to the National Gallery Trafalgar-square, Charing-cross, comprising 8000 superficial feet, with immediate possession; also the Freehold Public-house adjoining, known as the Monmouth Head, situate at the corner of Castle-street and Hemmings-row.

Messrs. Rushworth, Abbott, and Co. beg to announce that they have instructions to SELL the above mentioned valuable FREEHOLD PROPERTY. The houses erected on the ground are numbered 34, 35, and 41, Castle-street, in the rear of which is a large yard, with stabling and other buildings, immediate possession of the whole of which will be given, affording a most desirable opportunity for the erection of a public building, picture galleries, a museum, theatre, mercantile establishment, &c., being situate within 150 yards of Trafalgar-square, and in the centre of the metropolis. The Monmouth Head public-house, No. 17, Hemmings-row, is let on lease till 1909, and will form a separate lot. Plans of the whole estate may now be inspected, and further particulars obtained at the offices of Messrs. Rushworth, Abbott, and Co., 22, Savile-row, Regent-street, W., and 19, Change-alley, Cornhill, E.C., who are fully authorised to negotiate a Sale by Private Treaty.

IMPROVED DWELLINGS FOR THE PEOPLE.

THE ARTIZANS', LABOURERS', and GENERAL DWELLINGS COMPANY (Limited).

Capital £250,000. Shares £10. £1 paid per Share.
PRESIDENT—The Dean of WESTMINSTER.

ARBITRATORS.
Right Hon. Earl Shaftesbury.
Right Hon. Earl Lichfield.
Lord Elcho, M.P.
&c., &c., &c.

LOCAL COUNCIL.
Thos. Bazley, Esq., M.P.
Jacob Bright, Esq., M.P.
John Cheetham, Esq., M.P.
W. R. Callender, jun., Esq., M.P.

W. SWINDLEHURST, Manager and Secretary.

The Company is especially formed to erect improved workmen's dwellings on the co-operative principle. No beershop or tavern to be erected on the Company's property. Profits realised by workmen employed on the buildings 40 per cent. Deposits received at 5 per cent. Prospectuses on application, enclosing postage stamp. Office 1, Great College-street (opposite the House of Lords), Westminster, London.

Sovereign Life Office, 48, St. James's-street, and 110, Cannon-street, London. New Policies were issued in 1869 for £311,250, at an average of £680 each. The Life and Annuity Funds connected with the Office exceed £600,000. Advances are made on Freeholds, &c.; also, to a limited extent, on first-class Personal Security.
H. D. DAVENPORT, Secretary.

Just Published, 64mo, roan, price One Shilling.

Spons' Tables and Memoranda for Engineers, Selected and Arranged by J. T. HURST.
London: E. and F. N. SPON, 48, Charing-cross.
This work is printed in pearl type, and is so small, measuring only 2½in. × 2in. by ½in. thick, that it may easily be carried in the waistcoat pocket.

The Best and Cheapest Paint for Farm Buildings, Stables, Conservatories, Gardens, Park Railings, and all other outdoor work; Shutters in Iron, Stone, Stucco, or Wood, is JAY'S PATENT METALLIC PAINT. It covers well, dries quickly, presenting a hard glossy surface, and never blisters or cracks. The price is half that of ordinary paints, and it goes twice as far, one coat being equal to two. Prices, ready mixed for use, in all colours, 5s. 6d. per gallon, 27s. per cwt.; red, chocolate, and black, 4s. 6d. per gallon, 21s. per cwt. THE PATENT ADAMANTINE PAINT for covering iron, flat surface, dries in twenty minutes, as hard as the iron itself. 5s. per gallon, 24s. per cwt. Orders for 1 cwt. and upwards sent carriage free to any railway station in England, on receipt of remittance addressed to Wm. P. Owen, Woodham Works, Vauxhall Station, S.E.

Royal Polytechnic.—"Sand and the Suez Canal," by Professor Pepper.—Musical Entertainment, by George Buckland, Esq., "The Heart of Stone," with Spectral Scenes. American Organ daily. Dugwar's Feats and other attractions, all for One Shilling. "The Great City" at half-past 1. Suez Canal, at half-past 2 and a quarter to 8. Heart of Stone, at 4 and 9. Dugwar's Feats, at half-past 3 and quarter past 7. Open 12 to 5 and 7 to 10.

Kew. — Important Building Estate. The Cumberland Estate, adjoining the Royal Gardens, and close to the Kew Gardens Station, with new roads formed through the estate, offering choice Building Sites, TO BE LET, on Building Leases, direct from the Freeholder, at moderate ground rents. The soil is loam, with a subsoil of sand and gravel, and the climate is proverbially healthy. Water is laid on. By the new railway in connexion with the Metropolitan system, Kew is now readily accessible from all parts of the metropolis. Money will be advanced. Plans and particulars may be had of Messrs. DRIVER, Surveyors, Land Agents, and Auctioneers, 4, Whitehall, London, S.W.

To Builders and others.—To be LET by Tender, on Repairing Lease, Houses and Shops situate in Neptune-street, Bedford-place, and Goldsworthy-terrace, Rotherhithe. Particulars with Conditions and Form of Tender of Messrs. Driver, Surveyors, Land Agents and Auctioneers, 4, Whitehall, London, S.W.

To Builders.—Dulwich Estate. The Governors are prepared to LET on LEASE, for 84 years, PORTIONS of their ESTATE, for building purposes. There is ample railway communication, and special educational advantages in the new College are secured to occupiers of houses on the estate. For plans and particulars apply to Charles Barry, Esq., 1, Westminster-chambers, Victoria-street, S.W., architect and surveyor to the Governors.

Crystal Palace Company.—To Builders and others.—Crystal Palace Estate.—The Crystal Palace Company are prepared to let on building leases for a term of 99 years, certain portions of their freehold property abutting upon the Penge-road, Thickwood-road, Anerley-road, and Palace-road. Plans and conditions may be seen on application to John Norton, Esq., Architect, 24, Old Bond-street, W., or to Mr. Hart, Accountant, Crystal Palace, Sydenham, S.E.

A Capital Brickfield to be Let, 17 miles east of London, having railway sidings and a large wharf. Plenty of excellent brick and tile earth, also fine sand and abundance of water. Fixed rent and royalty moderate. Immediate possession. No stock nor plant to be taken. For particulars apply to Messrs. Burder and Dunning, 27, Parliament-street, Westminster, S.W.

Building Land, with Mansion and Stabling, at Acton, Middlesex, known as "The Friars," the property of the Goldsmiths' Company, and containing 13 acres, is to be LET, for 99 years, for the Erection of Detached Residences. It is a quarter of a mile from the Acton Station, whence there is communication with the City and West-end by the Metropolitan Railway. It is the highest land in Acton, well timbered, and having a fine prospect over the Surrey Hills southwards, and over London, Middlesex, &c. Apply, personally, at the office of Mr. Hesketh, London Assurance, No. 7, Royal Exchange, London, E.C.

To Builders, Contractors, and Others.—To be SOLD, several most substantially-built 10 ROOMED CARCASSES, some partially finished, drained into the main High Level sewer, situate near the new church of S. George's, in the Tufnell Park-road, Holloway, a wide road leading out of the main Holloway-road, near the Nag's Head and close to the Favorite Omnibus Route. Apply to Messrs. Dalton and Jessett, solicitors, St. Clement's House, St. Clement's-lane, Lombard-street.

Dry Wainscot, 3 years old, price 6d. to 9d. Mahogany equally cheap, at JOHN COUMBE'S Lady Lake's Grove, Mile-end Gate.

Wood Working Machinery.— ON SALE, and will be disposed of cheap, 1 Cross Cut Saw Bench, (self acting), will take in 12 × 3; 1 Wood Frame Squaring Machine, will plane 13ft. × 18in. × 2lin; 1 ditto, (second-hand); 1 Wood Frame Power Mortising Machine; 1 Iron Frame ditto, with boring attached.—Full particulars can be had on application to W Furness, and Co., Globe Works, Liverpool.

THE BUILDING NEWS.

LONDON, FRIDAY, JUNE 24, 1870.

ON THE COMMERCIAL MORALITY OF THE BUILDING TRADE.

THE revelations made at the coroner's inquest held upon the two men killed by the falling of a stone cornice which they were engaged in fixing on a new warehouse in York-street, Manchester, reveals a state of things most disgraceful to all concerned. Plans and specifications are prepared and submitted to the borough surveyor for approval. He sees nothing in them objectionable, everything appears to be what it ought to be, and he, as a matter of course, gives the necessary permission to proceed with the works. The evidence goes to prove that the work was being carried out without any regard to the conditions specified, and, in fact, with an utter disregard of them, and the contractor acknowledged that when he submitted the plans and specifications to the borough surveyor, he (the contractor) had no intention of carrying them out, and consequently the specification was only drawn out to deceive. This case is now sufficiently well-known, and needs no comment from us. Its consequences are in themselves a sad enough commentary, and it is to be hoped will lead to a further investigation, in order to put the blame upon those who are really culpable.

Let it not be supposed that the above is an isolated instance. The moral turpitude and rottenness of a portion of the building trade is a sad truth, and calls loudly for a remedy. In commercial circles, if two or three men conspire to cheat and swindle another they are quickly handed over to the civil power for trial and punishment, but in the building trades men may conspire to defraud with the greatest impunity, and it seems to be held that if once the account is settled and the bill paid, there is no redress for a man, however much he may have been cheated.

There are, of course, plenty of honest and just men who are builders and contractors, and we believe that the majority of architects are gentlemen in the best sense of the word, far above the reach of all suspicion of wrong-doing; but, on the other hand, there are architects who make out specifications which they know will not be, and are not intended to be, carried out. And there are builders who take contracts knowing well that they will not be compelled to carry them out according to the specification. When these two are combined the conspiracy to defraud is clear.

Let us see how these things are managed, and some of their consequences. A gentleman wishes to build himself a house. He applies to an architect; if he (the architect) is an honest man he will do his duty to his employer to the best of his ability and knowledge. But if he is one of the class referred to above, the plans and specification will appear to be everything that is desired, and everything may be specified to be done in the best manner, and with the best material, and yet it may be all a falsehood from beginning to end, artfully drawn out with a deliberate intention to defraud.

In the first place, the specification may appear to include every item; the proprietor fondly imagines it does so, and in that belief signs the contract. But the architect and the builder know to the contrary; they know that there are numerous matters which are not included in the specification which will have to be done before the house is completed. These things will all be charged for as "extras," and large profits made, which may or may not be shared between the two, just as it happens; in fact, when there is a keen competition, contracts are often taken at the bare price of labour and material, the contractor depending entirely upon the extras for his profits. The next phase of the question is the swindle direct. The builder contracts to supply and use the best material and workmanship, but instead of doing so, he substitutes an inferior article in every respect, labour included. The architect may be either careless or wilfully blind, and the clerk of the works may possibly be, and in many cases *is* paid, to keep his eyes shut, and to wink at all sorts of malpractices. The proprietor (poor man!) has a fond faith in human nature, and for aught he knows he is getting a just return for his outlay; at all events, he believes *so for a time*, but when he has lived in his house for a twelvemonth his delusion vanishes, like the baseless fabric of a vision, but unfortunately does leave a wreck behind, to his sorrow. He finds that the flooring boards part company, that the window sashes get out of order, that the doors fit badly, the joints open, the mouldings yawn at the mitres, the handles come off, and the locks won't lock. The ceilings are cracked across in consequence of the joists being too weak; possibly the walls crack from badly-laid foundations. As to the roof, the rain soon finds its way through. He gets a plumber to examine the lead gutter, and he finds that instead of four or six pound lead being used, and for which weight he has paid, that two-and-a-half or three pound lead has been used; and so on throughout the whole chapter. A correspondent in our "Intercommunication" column, of the 17th inst., very aptly asks the question whether it is usual for an architect to receive 2½ per cent. from contractors in addition to the 5 per cent. received from the proprietor. In our experience we have found that some architects exact 2½ per cent. from the contractors on every 20s. worth, and in addition, 2½ in many cases is exacted for measuring up the work when completed, to that these men pocket 10 per cent. of the whole cost of the works. On the other hand, we are proud to say that the majority of the architects we have known would scorn to exact a fraction more than the usual price per cent.

Now what are the consequences of such a gross perversion of honour, and truth, and justice? In the first place, the proprietor suffers in pocket, and secondly, the rascality of the thing affects everybody connected with it. The architect is false to his employer. The contractor deliberately undertakes to do what he never intends to do, nor does do. His foremen are instructed to deceive the proprietor by lying and deceit, covering up bad work and hiding it quickly out of sight. The workman is pushed along, and not allowed half enough time to do his work well, and he is taught deceit by the example of those over him, and thus the leaven of unrighteousness spreads until it leavens the whole. When the workman sees the lax morality of his employer, who is supposed to be his superior in education as well as in position, his scruples of conscience are weakened, and in many cases he serves his master in the same manner as his master serves others—a very natural result. This is the fruitful source of a large amount of what is called "jerry work," "slop work," and "scamping work." The public themselves are much to blame in this matter for its spirit of bargain-making, the efforts made to get work done, cheaply—done, at a price which a moment's reflection would tell them cannot and will not be honestly done. Common sense ought to guide those who have properly built to this conclusion. Let anyone examine the lists of tenders for work to be done which appear weekly in the pages of THE BUILDING NEWS. The discrepancies between the highest and lowest tenders for the same job are astounding, showing that there must either be gross ignorance or great roguery intended. For instance, how is it to be accounted for that the highest estimate for one job shall be £900, and the lowest £390—considerably less than one-half? Now the highest contractor must either have made a great mistake, or he is an honest man who intends to fulfil and carry out his contract to the strict letter of his engagement, with a fair profit, to which he is entitled. But what are we to think of the contractor who engages to do the same amount of work for £390, and of course gets the job (for it is a singular fact that although every advertisement for tenders says that the advertisers do not bind themselves to accept the lowest tender, yet, except in very rare instances, they always accept the lowest tender)! The difference between £900 and £390 for the same amount of work, how can it be accounted for? In what does it lie? Well, to take a common sense view of the case, we can only conclude, first, charitably, that a great mistake has been made, or, in default, that inferior work and inferior material are to be used, or else the contractor does not intend to pay for his materials, and so square accounts in that way. Now we consider that when people give the work to the lowest tenderer in a case like this, they are simply offering a premium for dishonesty. If we wish to order a first-class coat we go to a first-class tailor, and we know that we cannot get a good article, both in material and fit, except we pay a fair price for it, and therefore we do pay a good price, and are satisfied with it; but if we go to build a house we expect to get a first-class house built for a third less than it would actually cost if honestly done, and every pound we can knock off we think a gain. Even shrewd merchants, famed for sound common sense and business qualities, hide their common sense behind their dollars in these cases, and imagine that if they strike a hard bargain with the contractor they will get the worth of their money. Never was a greater mistake made. They are sure to be "done" in the end. As we have before said, builders will take contracts for barely what they will cost, depending upon the extras to pay, them, but if there should not be any extras be well assured that they will not lose money if they can help it by any means, and that the work will suffer in some way or other. Good material and good workmanship command and must have a certain price in the market, and builders must make money and have profits; therefore, it is a short-sighted policy in the public to expect to get for £100 what, if honestly done, must cost £200. And this is not all, for in many cases the contractor sublets the work, and the sub-contractor, as a rule, is a struggling man without much capital, and in the majority of cases he has to draw on account, and has to pay for the accommodation. There can but be one result of such a practice. The bricklayer, the plumber, the plasterer, and the painter being thus mulcted of their profits, have no other resource but to scamp their work, and the head contractor winks at it, because he profits largely by doing so. We have known instances where the contractor has tried to carry out this swindling business, and has been checkmated by the architect, and been made to pull down and reconstruct works which have cost scores of pounds to put up.

It may be asked, Is there no remedy for this state of things? We confess we are at fault here. We are all quick enough at finding out abuses, but finding out a remedy is rather more difficult. In the first place, we would advise gentlemen who build to employ a first-class architect—an honest one at all events. His charges are clearly defined, and we know that he will not make a clandestine profit out of us, and will see that we have the work for the money. He does not exact a percentage from the contractors, and so they can afford to do their work honestly.

Secondly, we should consider that in building a house the wise question is not who will do it the cheapest, but who will do it the best and most honestly. A "jerry-built" house is dear at any price, and one of the worst possible investments of money, for it will soon cost more to keep it in repair than the difference in first cost between a really good house

and a "jerry-built" one. If these points were considered and kept in view when about to build, a better price would be paid, and there would not be so great a temptation held out to dishonesty in these things. We do not know much about the law of the case, but if there is not a law existing which would enable one to obtain legal redress in these cases there ought to be, and thus compel compensation for the injury received. If this were the case, and the cost of proceedings thrown upon the defaulter, we should have less cheating and more honest work; but, unfortunately, many of us would rather put up with the ills we know of than encounter more in meddling with the law as at present constituted. The practice of these things is a disgrace to us, a canker worm at the heart of the building trade, corrupting the workman physically and morally, making them cheats, liars, and false dealers, and the sooner it is rooted out from amongst us the sooner will truth and right and honesty prevail.

THE ANNUAL CONVERSAZIONE OF THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE usual conversazione of the Institute has grown into an institution, and, judging from the large attendance of members with their friends, and strangers last Wednesday evening, its interest, far from being on the wane, is steadily increasing. The rooms were filled with a large and brilliant assemblage of ladies and gentlemen, and we noticed among the latter many civil engineers and artists of eminence, as well as all the principal architects of the metropolis, with many from the provinces. The rooms were most tastefully arranged and decorated with flowers, and with a large and miscellaneous collection of works of art and objects of interest which were eagerly examined. The lower galleries of the Architectural Union Company, filled at present with the Architectural Exhibition drawings, were thrown open, and the Coldstream Guards discoursed sweet music from an elevated minstrels' gallery, erected for the occasion at the end of the largest room, and refreshments were liberally provided in those adjoining.

To give an idea of the collection of works of art we would mention that among the pictures were Mr. MacCullum's beautiful Glade in Windsor Forest, with an appropriate architectural painting of the Roman Forum, with its ruined columns standing up purple against a grand sunset, with a third picture of the Colosseum, roseate with hues of the same period of declining eve, contributed by the artist; J. M. W. Turner's weird and imaginative Whalers, and a pretty sketch in oils of Hampstead Heath, by Constable, lent by T. Woolner, Esq.; a fine painting of five of the Doctors of the Council in Rome engaged in an animated discussion, exhibited by the artist, A. B. Donaldson, Esq. As a strictly architectural painting well treated, we were glad to notice one in oil by H. W. Brewer, Esq., of Hildesheim Cathedral, and one of the ancient church at Bettws-y-Coed, dear to many artists from its association with their haunts, by Field Talfourd, Esq., taken before it was spoiled, as it has been, by recent restorations, and the same artist sent several pleasing watercolour sketches. A Roman Palace, painted by Rousseau, lent by P. Masey, Esq., was noticeable for its fine tone and composition. The President, T. H. Wyatt, Esq., lent several charming watercolour drawings; the Castle of Ostia, by Harry Johnson; Joanina and Spalati, and a view of Philates, by Edward Lear; a Street in Cairo, by Callow; and two sketches in Venice, by E. W. Cooke, R.A.; and a Portrait of Sir Jeffrey Wyatville by A. Chalon, R.A.

Among other watercolour drawings, Mr. Ernest George, Associate of the Institute, sent several architectural subjects, as Burgos Choir Aisle, and the Cathedral at Avila, and others, striking in effect, but somewhat undecided in execution.

Mr. R. P. Spiers lent some of his best drawings—the Mosque of S. Sophia, Constantinople, and the Temple of Wingless Victory at Athens, the Pantheon, and the Erectheum at Athens, and a smaller one of Lucca Cathedral façade, and others.

Mr. F. Wilkinson contributed a drawing of the Interior of S. Gudule, Brussels, by Louis Haghe, and the Bridge at Toledo, by the late D. Roberts, and a very fine drawing by S. Read of the Interior of the Dom Kirche at Lubeck, and others.

Mr. E. Nash, Fellow, sent a pleasing painting by himself of North Cray Church, Kent; and Mr. C. L. Eastlake, Assistant Secretary and Fellow, a sketch of a Lady at an Open Window, by himself, with a very pretty watercolour sketch of the Walls of Dinan.

In the Library we noticed a careful plan and perspective of a Temple to Victory according to antique uses, by Mr. Thomas L. Donaldson, Hon. Secretary; a curious Early German painting of S. Jerome, and a portrait in chalk of Inigo Jones by Vandyke, lent by C. J. Shoppee, Associate; an interesting drawing of Westminster Bridge, with the Houses of Parliament and Abbey, by R. Carrick, exhibited by the Messrs. Kell, the lithographers to the Institute.

Mr. G. E. Cook, glass painter, sent a fine cartoon of the Virgin and Child, with two Angels, by Mr. Holliday, the artist.

Mr. J. B. Waring sent several folios of his clever sketches of varied subjects, and Mrs. Marrable two good drawings, The Stelvio Pass in the Tyrol, and Spring-time in our Garden. Some fine drawings by old masters were also lent by Joseph Clarke, Esq., F.S.A.

Among miscellaneous objects of art and vertu we noticed particularly two velvet portiere curtains, with borders richly embroidered, by Mrs. A. Blomfield; and a striking drawing-room settee, designed and lent by Mr. C. L. Eastlake, after the character of those at Knole Park, covered in green velvet, relieved with gold bands.

Messrs. Gillow sent several novel pieces of furniture in the Mediæval style—one cabinet in black wood, designed by Mr. J. Talbert, with panels in the coved upper part of the back, filled in with stamped leather enriched with gold. This, quiet and refined in itself, formed an admirable receptacle for specimens of ornamental glass contributed by Messrs. Salviati. Another cabinet, by the same makers and designer, in oak, with carved panels in boxwood, was charming in itself, and its effect was enhanced by beautiful examples of Oriental pottery, sent by Messrs. Farmer and Rogers, and some excellent and graceful imitations of Venetian glass by Messrs. Powell; while a third cabinet in walnut was quite resplendent with inlays of various-coloured woods, and yet quite free from gaudiness. In these specimens it appears to us that Mr. Talbert has made a great advance; his work is now more essentially wood, and not so ornamental, as if of stone, as of yore.

Other specimens of Mediæval furniture were sent by Mr. Bassett Keeling, Associate; an oak chair, designed by Mr. Bevan. Messrs. Salviati, as usual, contributed a fine collection of Venetian glass and mosaics, and cartoons by Wirk, intended to be executed at S. David's Cathedral for Mr. Scott. These may be described as imitation in opaque material of the effect of stained glass, to occupy some blank windows in that edifice; the cartoons for them were by Messrs. Hardman, of Birmingham. Messrs. Clayton and Bell also sent the mosaics of Henry III., prepared for Cardinal Wolsey's Chapel at Windsor.

An interesting case of photo-mechanical patent printings, by Edwards and Kidd, attracted attention, the more so, as the beauty of the drawing of an old timber-constructed staircase, discovered and drawn by Augustus Browne, Esq., had been the subject of the plate in question. This formed one of the illustrations for the new *Photographic Art Journal* for April, 1870.

Fine specimens of pottery and majolica were lent by Messrs. Mortlock and Copeland, and embroidered altar frontals, &c., by Messrs. Harland and Fisher. Messrs. Heaton, Butler, and Bayne sent a frame of good designs for painted glass, designed by H. Ellis Wooldridge, Esq.,; and, to conclude, although we fear inadvertently to have omitted many things deserving notice, we were particularly struck by the admirable nature of some specimens of a material suitable for permanent painting and decorations, manufactured and exhibited by J. Powell and Sons, of the Whitefriars Glass Works, and called by them opaque glass. It is washable, and the tone and colouring good, and may either have a glazed or unglazed surface, as desired.

The company did not separate till a late hour, and, we think, fully appreciated the labour and taste with which the Council and authorities of the Institute had catered for their enjoyment and inst ruction.

LANCASHIRE RIVERS AND WATER SUPPLY.

THIRTY miles above Clitheroe, in a district of limestone shale, a couple of brooks, there called "becks," join to form the river Ribble, which holds its course by Clitheroe and over the new red sandstone to Preston, where it discharges into the estuary. A little below Clitheroe it receives, on its right hand, the Hodder, from a district of limestone shales and millstone grit, and on its left bank the Calder, the chief towns within the basin of which are Burnley and Accrington, on the coal measures.

Again, it receives on its left bank, at Preston, the Darwen, which has its rise in the coal measures, the chief town within its basin being Blackburn. Down to Preston the Ribble basin has an area of 412,480 acres, and a population of 387,839 (census 1861). To complete the watershed of the Ribble, there falls into the estuary of that river below Preston, on its left bank, the Douglas, which has within its basin Wigan and Chorley, on the coal measures, with Ormskirk on one of its dividing ridges, and adds an area of 109,760 acres and a population of 101,337.

We have made these few remarks in order to clear the ground for a statement of what the Royal Commissioners, who were appointed in 1868 to inquire into the pollution of the Mersey and Ribble, report on the state of those rivers in respect of the water supply to the towns within their basins, the Mersey being by far the more important and extensive, both geographically and biologically.

Of the tributaries to the Mersey the Irwell is the largest, and it has characteristics sufficiently marked to have caused instructions to be given to the Commission to report specially upon it. Within its area are included Manchester, Salford, Ashton, Oldham, Rochdale, Bury, and Bolton. Its area is 199,520 acres, and its population 1,014,569 (census 1861).

These inquiries bring out many interesting features of life apart from those specially inquired into, and one of them is the congregation of people on the coal-fields of the country; and the geological map accompanying the report shows that the basin of the Irwell is wholly occupied by the coal measures. The valley of the Irwell had a population of 253,327 in 1801, 555,724 in 1831, and 1,014,569 in 1861, being in comparative density 812 persons per square mile in 1801, 1782 in 1831, and 3254 in 1861, while in the valley of the Ribble (the Ribble proper) the rate was 151 per square mile in 1801, 277 in 1831, and but 460 in 1861.

And this congregation of people on the coal-fields has had the effect of polluting the streams of water to such a degree that, unchecked, it has reflected its influence on the health of the people. It reaches people's

health in various ways. By pouring larger quantities of filth into the rivers than their waters can chemically change and render harmless the superabundant gases are given off into the atmosphere and become inhaled into the body; while the requisite quantity of pure water for domestic use is lessened more and more, until it is hardly procurable at all, and not at all without great expense in bringing it into the towns from the distant hills.

The Irwell is taken as a type of these rivers, and within its watershed, the area of which is 311¾ square miles, there are 1160 cotton mills, 200 woollen mills, 45 alkali and chemical works, 25 paper mills, 20 tanneries, besides numerous mills and works of various kinds to supply the wants of the population, such as saw mills, corn mills, gas works, iron works, &c., or an average of 5 mills or other manufactories in every square mile.

Both the main and the tributary streams are made use of up to their very sources. The result of the pollution of the streams in the Irwell basin by discharging into them the excrementitious and manufacturing refuse of this large population may be usefully compared with the state of the Thames at Hampton. The organic carbon and the organic nitrogen (commonly called organic matter) are the two chief ingredients in the pollution of rivers, and taking the pollution of the Thames at Hampton = 1, that of the Lancashire rivers is as follows:—The organic carbon in the Calder below Burnley is 3·6; of the Irwell below Manchester, 4; of the Medlock, in Manchester, 6·5; of the Irk, in Manchester, 4·2; and of the Mersey below Stockport, 4·1; while the organic nitrogen in the Calder is 49·3; in the Irwell, 20·5; in the Medlock, 48·9; in the Irk, 17·7; and in the Mersey, 40·1; the Thames in each case being = 1.

Where rivers are polluted to the extent here shown, it is of course a matter of difficulty to procure a sufficient quantity of water for domestic use, and also for some manufacturing purposes. The Commissioners take the rainfall of the district, as supplied to them by Mr. G. J. Symons, at 39in., being the average of the seven years from 1862 to 1868 inclusive, the maximum of those years being 47·37, in 1866, and the minimum 32·23in., in 1865, and 32·30 in 1864; these two dry years being preceded by 45·60in, in 1863, and succeeded by 47·37 in 1866.

Of this quantity of 39in. the Commissioners take 20in. as the depth that flows off the ground, or, as they say, 448,000 gallons per acre, the remainder being evaporated and absorbed by vegetation.

The purposes this water has to serve are (1) the needs of inland navigation within the district, (2) the wants of the population for all domestic purposes, and (3) the provision for manufacturing purposes.

The country is intersected with canals leading up the different valleys from points on the coast or on the estuaries. These, before the introduction of railways (and we have given the population in 1831 as being that when railways began to be made in the district), were the main line of traffic for minerals and for other raw as well as manufactured produce; and although a large proportion of this traffic has been transferred to the railways, there is still a great deal left to the canals. The quantity of water withdrawn from the rivers for the maintenance of this internal navigation is very large, being represented by the number of locks full of water used to pass vessels up or down the canal. The following are the approximate quantities consumed annually for this purpose:—

	Gallons.
The Rochdale Canal . .	1,682,000,000
The Ashton Canal . . .	2,385,000,000
The Peak Forest Canal .	1,770,000,000
The Bridgewater Canal .	3,077,000,000
Total	8,914,000,000

The next demand made upon the rainfall is for the personal wants of the population, and this is set down at 25 gallons per head per diem, or 9000 gallons per annum, and this quantity, in sufficient purity for domestic use, can only be procured from the high lands within the water-shed.

The third demand upon the available water supply of the district is made by the different manufacturing interests within it. The quality, as well as the quantity of the supply, has to be considered. As regards the former, to show how great a value the manufacturers themselves have put upon a restoration of the rivers to their naturally clean condition, it is sufficient to say that it has been represented by thirty manufacturing firms that to them alone a restoration of the river to its original purity would be worth £10,000 a year.

The present large demand of factories on the water supply of this district will be lessened when the various abuses to which the rivers are now subjected have ceased, and so will set free, for domestic use, a large portion of that water which now goes to the supply of factories, and which, in the case of the Manchester Waterworks, amounts to one-third of the whole issue.

But however ample for all purposes an available quantity of 448,000 gallons per acre per annum might be, it is unsafe to reckon upon that or any other average quantity, as has been amply shown by another Commission, that on water supply. It is the long droughts that try the capabilities of waterworks, especially of gravitation works, and no doctrine of averages can be relied upon. The minimum quantity, or rather the mean quantity of three consecutive dry years is all that can be stored and made available by any reservoirs of practicable dimensions. As an illustration of what has already been done in Lancashire to economise the rainfall for domestic and trade purposes, the particulars of the waterworks of fourteen towns are given in the report which have an aggregate population of 1,420,000, from which it appears that they impound the water from 50,443 acres in reservoirs, which have, on the average, a capacity of 36,000 cubic feet per acre of the drainage area, and that the cost has been, on the average, £3 5s. per head of the population.

CASTLES IN SHROPSHIRE.

STOKESAY, BRONCROFT, AND HOLDGATE CASTLES.

SHROPSHIRE is even richer in the possession of castles than Monmouthshire. Both counties owe them to the fact of their having been part of the Marches on the border country between England and Wales. The principal castles date from the Norman period; but during the reigns of Henry I. and Stephen, and still more frequently in that of Henry III., when England was disturbed, and the Welsh made frequent inroads into it with the object of repossessing themselves of the lands of which they had been deprived, not only the great lords, but their dependents, needed tenements capable of defence, and for these latter numerous small castles or fortified houses were then erected.

One of the most interesting, compact, and perfect of such buildings is Stokesay Castle, situated about half a mile from the Craven Arms Station. The manor was held till 1250 by the family of Say under the Lacys, but was sold to Lawrence de Ludlow in 1281. He, in 1290, was licensed by the King "to strengthen with a wall of lime and stone and crenelate his mansion at Stokesay." As, however, the style of architecture of the principal buildings is obviously of an earlier date, the works contemplated by the above could only have been additions. With the subsequent history of its owners we have but small concern, and shall confine our further remarks to the structure itself.

The whole site is irregular in form, approaching a parallelogram about 150ft. in either direction outside the walls, with a moat about 20ft. wide surrounding it beyond them. Access is now obtained on the east side through an Elizabethan gate-house of timber construction richly ornamented. This is an oblong building of two stories in height, the upper one projecting considerably over that below, the opening for the gateway being in the centre, and a bold dormer rises above it to the level of the ridge of the main roof. The lower story is composed of vertical studding, with one horizontal tier of inter-ties, but the upper one is divided by the framing into a series of square panels, each decorated with a lozenge form by ornamentally-cut braces, in the manner familiar in the houses of Shrewsbury and the neighbourhood generally, and the marked contrast between the two has a rich and striking effect.

Opposite to this gate-house, on the side next the moat, the court-yard intervening, is the castle itself, consisting of a large hall about 50ft. long by 30ft. broad, a two-storied building, with a withdrawing-room on the upper floor about 30ft. by 20ft. to the left. Attached to this by a gallery is the main tower, further to the left, which has an irregular polygonal plan about 40ft. in diameter, within which is the principal apartment, or solar, reached by an external staircase from the court-yard; and on the right hand of the great hall is another smaller tower with an overhanging upper story of woodwork projecting on corbels over the walls below in a picturesque manner.

The hall is divided into four bays by wide flat pilasters, not carried up from the ground, but from well-moulded corbels about 4ft. above the floor line. These pilasters are continued up to receive the massive roof principals, and finish with a very simple impost moulding. The principals are of oak, and exceedingly massive and rude, and each pair have a collar-beam and curved braces, almost forming a perfect arch. Each bay on each side of the room has a lofty two-light window with trefoiled arched heads and uncusped circle in the head, and the lights, being lofty, are divided by a transom. The proportion and detail of these windows, which were glazed above and furnished with shutters and seats in the sill, are remarkably good; they rise considerably above the wall-plates, and have coped gabled roofs over them running transversely with the main roof. One bay next the court has its window shortened, and a fine doorway to correspond below. The hall has no fireplace, but there is a hearth in the middle for a wood fire to be placed upon iron dogs.

The smaller tower (which, by its detail, seems to be the earliest part of the structure), to the right of the hall, has three stories. The lowest room below the level of the hall is entered from it down some steps, and is lighted as the story above by narrow lancet windows of remarkably good shape and proportion, and there are remnants of coloured decorations on the walls. It contains a well to draw up water from the moat. The two stories above are reached by an oak staircase at this end of the hall; the upper room in the timber-built portion has an Early English projecting fireplace. The solar in the great tower has eight lancet windows and an arched stone chimney opening surmounted by an elaborate carved wooden mantlepiece of the time of Charles II. Outside, the tower is of a curious and picturesque form, showing the appearance from the moat of two octagonal towers thrown into one. The height is not great, and the effect, which is admirable, is due mainly to its proportions. The two stories, the tower of which is much higher than the other, are divided by a string course, and there is a very deep battlemented and loopholed parapet, and a staircase turret carried still higher at one angle.

Holdgate Castle, a few miles distant, in a wild country, is now converted into a farm-house. It dates from shortly after the Conquest, and was first called Stantone, but afterwards became named after its founder, Helget,

a follower of William I. A large round tower with a small turret corbelled out from the angle where it joined the wall of the main structure are the only portions of interest now left. But Broncroft Castle, which is its near neighbour, has suffered less, and still presents much that is interesting and worth examination. It seems to have somewhat resembled Stokesay, but to have been upon a still smaller scale. It is now under repair and partial restoration by Mr. Seddon. The ancient portions consist of the entrance hall, in this case only 30ft. by 18ft., with walls 3ft. thick. It had an archway in the centre, with two chamfered soffit ribs dying upon plain jambs, with the outer edges only splayed, and traces of windows springing thence outwards show that there was originally a porch of some description, the loss of which, as an unusual feature to such a building, is much to be regretted. There was a window of a similar description to those of the hall at Stokesay on each side of this entrance. A large corbelled and hooded stone chimneypiece occupied the centre of the end to the left on entering. To the right and left of this hall were low towers. These have been much altered, and their present condition is little to be relied upon as explaining their original design. Each had a stone circular staircase turret attached to it, doubtless leading in each case to the top of the tower, deeply battlemented and loopholed for defence, like the larger one at Stokesay.

Even these mutilated fragments at Broncroft are of very great interest, and it is to be hoped will not suffer further modifications, which may obliterate the testimony they are still able to give as to the character of a moderate-sized gentleman's house in the troublous times in which it was erected. In itself, Broncroft is of far inferior value in this respect to Stokesay, but the points of comparison between the two enable each to aid the student of the architecture of either.

ARCHITECTURAL ASSOCIATION.

AT the usual fortnightly meeting on Friday evening last, Mr. Thomas Henry Watson, vice-president, in the chair, the following gentlemen were elected members :—Messrs. H. Saunders, M'Carthy, and E. M. Gibbs. It was announced that to-morrow (Saturday) the members would visit the new Jewish synagogue now in course of erection in Upper Berkeley-street, and that on Friday evening next Mr. G. H. Birch, librarian, will read a paper on the Charterhouse. The annual dinner will take place on Saturday next, at the Talbot, Richmond.

Officers for Session, 1870-71, having been nominated, it was announced that the election would take place on Friday next, which will be the concluding meeting of the Association for the Session.

The CHAIRMAN congratulated the members on the great step in advance which the Voluntary Architectural Examination had this year taken, and this was due in no small degree to the efforts which the Association had put forth to make it a success now that some tangible acknowledgment (the certificate) was to be given to successful candidates.

It was further announced that four out of the five successful candidates were members of the Association, and a letter was read from Mr. Phené Spiers, expressing his hope that in a few years' time the possession of a certificate of having passed the examination would be an indispensable requisite for a man wishing to obtain employment in an architect's office. Sooner or later, too, he thought the certificate would acquire a legal validity, and, in addition, be the only means of obtaining a membership of the Institute.

Mr C. HENMAN, jun., (who was announced to have read a paper on "Rhenish Romanesque Architecture," but was compelled by certain circumstances to abandon that intention) then read an interesting paper on

THEIR CHITECTURE OF HEREFORDSHIRE.

The author pointed out that the county was comparatively inaccessible in former times, and many parts so even within the memory of living men. This difficulty of communication with surrounding counties of course influenced its architecture, in which there were many peculiarities not seen elsewhere. It being on the Welsh border, too, a fortress-like character was impressed upon even ecclesiastical buildings, and it is probable that many of the church towers were expressly intended to serve as strongholds. The suitability of the county for the architectural sketcher was particularly pointed out, it being to a great extent an unexplored field. The use of tufa prevailed in some of the early churches, as at Moccas and Bredwardine, while slabs of shale were employed in others, as at Rowlston and Kilpec. The roofs of these early churches are generally covered with thin slabs of stone, necessitating large timbers. The churches of the county, too, present many peculiarities of plan, notably the strange positions of the towers at Holmer, Yarpole, Ledbury, Richards' Castle, Bosbury, Pembridge, Weobley, All Saints (Hereford), &c. Kingston, Brinsop, and Holm Lacy have two naves or aisles of equal length divided by an arcade. Very few churches have two transepts, many have no aisles, and a few are simple parallelograms, as at St. Michael's and Brobury (both Early English). Prominent in Herefordshire churches are the boldly-designed bases or plinths on which they stand ; Clehonger and Eaton Bishop are good examples. A peculiar type of window prevails in the county. It is of all dates, from Early Decorated to Late Perpendicular, and consists, in its simplest form, of an opening about 4ft. wide, with pointed arch divided into three lights by two mullions. This type of window, with various modifications, is seen at Ledbury, Clehonger, Mansell-Lacy, and Tarrington.

There is abundance of Norman work in the county ; nearly every church contains some feature, and many are entirely in the style, as Kilpec, Rowlston, Moccas, Bridge Sollars, &c. The earliest existing work is probably the lower portion of the south transept of the cathedral, the sacristy on its east side, and the adjoining aisle wall. Mr. Henman then proceeded to describe the most noticeable features in the following churches :—Eaton Bishop, Bredwardine-over-Wye, Rowlston, Moccas, S. Michael, Peterchurch, Kilpec, Shobden, Fownhope, Stretton Sugwas, Garway, Leominster, Bridge Sollars, S. Mary Madley, Brobury, Castle Frome, Kingsland, Eardisley, Binghill, Yarkhill, and Vowchurch.

Of the Transitional style, perhaps the best example is the space between choir and lady chapel, with the adjoining portion of south-east transept at Hereford Cathedral. At Abbey Dore, in the Golden Valley, is some very fine work of first Early English character. S. Mary Madley is an example of good solid plain Early English work, with Decorated additions. Hampton Bishop, Brobury, Mansell-Lacy, Dillwyn Magna, and other churches containing Early English work were next described.

The Perpendicular work in the county is not different to that found elsewhere, but it retained its purity of form without debasement for a longer time than in more forward localities, Bishop Booth's porch, for instance, on the north side of the cathedral (1530) might pass for work of the previous century. Bishop Stanbury's chapel (1453—1474), on north side of choir, and Bishop Audley's (1493—1502), on the south side of Lady chapel, are rich and good examples. At S. Weonard's is a curious church in this style, with quaint details. At Mornington-on-Wye (1679) the church retains in a very debased style many features of Perpendicular work.

Of domestic work there are some good half-timbered constructions at Ledbury, Weobley, Pembridge, &c. The Town Hall at Hereford, built or restored in the seventeenth century, was a picturesque many-gabled building, standing on thirty-six columns. There were castles in plenty in the county, but of these there is little detail left. In concluding his paper, Mr. Henman remarked on the general character of the work, which was, with a few exceptions, plainer than in most other counties. Mouldings are scarce, and after the era of the Kilpec and Shobden work very little carving is to be found, but the work is generally solid and of good proportion. The district is an excellent one to study in for those who are inclined to overload their designs with ornament, for they will there learn that much may be done with simple means judiciously used. The paper was illustrated by a very large and beautifully-executed series of sketches.

In the discussion which followed, Mr. Blashill, as one acquainted with the locality, expressed his delight with the paper, and complimented Mr. Henman upon the conscientious way in which his drawings were carried out. Mr. Quilter, Mr. J. T. Perry, and the chairman also took part in the discussion, at the conclusion of which the usual vote of thanks was accorded the reader of the paper, and the meeting terminated.

PROPOSED RESTORATION OF EXETER CATHEDRAL.

THREE years and a half ago, Mr. George Gilbert Scott made an elaborate report on the work necessary to be done in restoring this venerable cathedral, and in a supplementary report, recently made to the Dean and Chapter, Mr. Scott deals with the objections that have been raised to some of the suggestions contained in his first report. In his first report, Mr. Scott said, in reference to the rood screen, that it "would be the height of Vandalism to remove one of the most marked of the original features of the cathedral." To his surprise, the Exeter Diocesan Architectural Society took exception to this opinion, and nearly the whole of Mr. Scott's supplementary report deals with the objections urged by the society.

The subject was referred to at the annual meeting of the Society on Tuesday week. The committee reported that since the last general meeting much correspondence had taken place between them and Mr. Scott, whose scheme at one time involved the removal of the tombs of the ancient bishops and other worthies from the sides of the choir, but when attention was called to this matter in a memorial of the committee, addressed to the Dean and Chapter, Mr. Scott acknowledged that it was "out of the question to remove the ancient tombs." The committee remained at issue with Mr. Scott as to the propriety of removing the ancient rood-screen. Mr. Scott wished to retain it, on this ground, amongst others—that the separation of the nave from the choir, by means of this screen, was contemplated in the original design of the building. The committee, on the other hand, urged that it should be removed, in order to adapt the building to the present service of the English Church. When the choirs of cathedral and collegiate churches were constructed, they were intended principally for the use of the regular clergy in reciting their hours, whilst the services for the people were, as a rule, conducted in the nave. Such an arrangement, however well suited to the times of monasticism, implied circumstances no longer existing in England. The committee felt most strongly that the rood-screen should be so treated that the present anomaly of the nave and choir, which should be parts of one church, forming practically two distinct churches, should cease to exist. They also urged the maintenance of the principle (which, they observed, meets with general acceptance, and is carried out in nearly every parish church) of setting apart the choir or the chancel for the use of the clergy, choristers, and communicants, and the nave for the use of the laity generally. They had the less hesitation in taking their stand upon these principles, because they had been recognised by Mr. Scott himself in the restoration of Ely, Lichfield, Hereford, and other cathedrals, and were substantially embodied in his recently-published report on the restoration of Salisbury Cathedral. The committee explained that they did not advocate the removal of the entire screen, but only a block of masonry composing the easternmost portion of it, and having no architectural merit. The removal even of this portion, they acknowledged, would be matter for regret from an antiquarian point of view, but the love of mere antiquity for its own sake ought to give way to the higher consideration of making the building useful to the end in view, in conformity with recognised principles of arrangement. In concluding their report, the committee set down by way of contrast the "standpoints" of themselves and Mr. Scott:—He would preserve the rood-screen because it formed part of the original design ; whilst the committee would remove a portion of it in order that the use of choir and nave at the same time might be practicable ; and they did not think that for this purpose it was necessary to destroy any feature of artistic worth. They held that there was no more reason for preserving the plain masonry of the East front of the rood-screen than for preserving the flank walls of the aisles ; and yet these had been covered in our own days as well as in times past with tablets of all sorts. What would be the

consequence of Mr. Scott's proposal? The object of it was to preserve the rood-screen, and yet should it be adopted, the screen—as a rood or choir screen—would be entirely destroyed. A rood or choir screen was placed between the choir on the one side and the congregation on the other. If the congregation were to be placed in the choir, then the nave became a lobby. But what term could be used to designate the screen, which in this case would be a kind of boundary between the lobby and the actual church?

Some discussion ensued, and on the motion of Mr. H. Ford, seconded by the Rev. W. T. Radford, it was unanimously resolved, "That the Committee be requested to draw up a memorial to the Dean and Chapter, begging them to call in another architect to advise them, as well as Mr. Scott."

The Dean and Chapter have replied to the memorial of the Society, and coincide with Mr. Scott's views as to the screen.

USING POOR TIMBER.

MEN who work in wood frequently have more or less, and sometimes a vast amount of miserably poor timber, And, if they are not scrupulously honest such timber is frequently worked in among other timber of a better quality. In making window sashes and panel doors, for example, most manufacturers seem to think that it is *allowable* to work a bar or two of sap-wood into a sash; and, in most instances, they will insist that if one or two bars of sap-wood in a sash, or one stile of a door, or both, perhaps, are half sap-wood, it cannot detract much from the value of the article so long as a large proportion of the timber is of better quality. But, in reality, a window sash or a panel door that is only one-sixth part sap-wood, and the remainder clear stuff, is no more valuable than it would be if every stick were made of sap-wood. In case one-fourth part of the stiles of a door are sap-wood, and water can enter the pores at the joints, the sap portion will decay in the course of a few years. Of course such a door or sash would be of little value, as the remaining sound timber would not be in a proper form to be used for repairing the door or window sash. The true way to dispose of sap-wood is to make an entire door or sash or window frame of clear stuff, and another of sap-wood; then when the sap-wood begins to decay, every piece will become worthless at about the same time.

People who purchase window sashes and doors at factories are often swindled in an outrageous manner by the honest tricks of shrewd traders, who work in a vast deal of miserable lumber, and cover it with paint before the articles are offered for sale. For inside doors, sap-wood may be employed; but purchasers should demur at paying the same price for doors or window sashes that are streaked off with sap-wood that they would for similar articles made of clear stuff. Sap-wood will always shrink much more than heart timber, which fact is another good reason why the two kinds should always be worked sepatately. The same care should be exercised in rejecting sap-wood in outside casings, corner boards, and siding. There may be a strip of sap-wood only one inch wide on the edge of a clear board, and a person of little experience would be apt to think that a strip so narrow could be of little account either one way or another. If a floor board or a weather board has decayed one inch on the edge it would be quite as well if the entire piece had failed. Wheelwrights are usually trained to work two or three spokes of poor timber into each wheel, and if a customer were to see such a defect, shrewd tricksters will reply that "There are only one or two—not enough to cause any damage." But the truth is it would be far more satisfactory to make every part of a uniform quality of timber, so that all parts of the piece may fail at one and the same time; then, a new wheel could be made.

Nothing is more perplexing than frequent repairs on a vehicle or implement in consequence of a piece of poor timber. Many a manufacturer of agricultural implements, prompted by a penny-wise desire to save ten cents. by working a brash piece of timber into some valuable implement, has injured his business more than ten dollars. We have in mind a manufacturer of farm implements who toiled laboriously to make an honest living, but a farmer who purchased of him once would go a long distance, and sometimes directly past his manufactory, to the shop of some other person, who would not employ such worthless timber. Purchasers should educate themselves to understand what poor timber is, and they should be able to appreciate the disadvantages of using that of an inferior quality. Then they should refuse any article offered for sale, if every part be not made of the best quality of timber.—*Technologist.*

PARLIAMENTARY NOTES.

NATIONAL GALLERY.—TURNER ROOM.—Mr. Lambert asked the First Commissioners of Works on Friday last whether he considered that a considerable number of the pictures in the Turner Room of the National Gallery were creditable either to the national taste or to the national talent, and whether it was not desirable that they should be removed, to give place to other works of art.—Mr. Ayrton observed, that if he replied to the question he should really be making himself the arbiter of the national taste and talent, a position which he should be very reluctant to assume. Perhaps the best course of the hon. member, if he wished to elicit an expression of opinion on the subject, would be to submit a resolution and take the sense of the House upon it.

KENSINGTON ROAD IMPROVEMENTS.—Mr. Ayrton stated on Monday, in reply to Sir H. Hoare, that the only plan of these improvements made was that which was deposited with the Bill, in accordance with the standing orders. If there were any agreement between the owners of property, between the Albert Hall of Arts and the Exhibition Commissioners, a copy might be obtained by motion in the House. The only agreement proposed to be entered into between the Office of Works and the Exhibition Commissioners was one by which the Office of Works would hand over to them a portion of the road not required, on condition of their making a contribution for the purpose of carrying the Act into effect. It was not in the nature of a charge on the land, because the Office had always contended that the Exhibition ought not to be charged in regard to any public roads for the metropolis. With respect to the stoppage of Rotten-row, he reminded the House that the arrangements with regard to the parks were made by the authority of Her Majesty's Ministers, and it was unusual to come to the House and ask for authority to lay them out. Such a thing had never been done, and it would be better to adhere to the usual mode of administration. When alterations were required, an estimate was laid on the table, and the arrangements were then open to the criticism of the House. No details of plans had been given to Mr. Mann, the superintendent of the park, for the simple reason that they had not yet been settled; for the same reason they could not be laid on the table. With regard to what was intended finally to be done, he hoped the hon. member would postpone the question to a future day.

THE NEW LAW COURTS.—In reply to Lord E. Cecil, Mr. Ayrton said that questions of a very complicated character, and which would take a considerable time to solve, had arisen in connection with the site of the new courts of law. It was desirable that these questions should be solved before the plans could be agreed to or produced.

THE UNIVERSAL ART CATALOGUE.—Mr. Dillwyn, on Tuesday, asked the Vice-President of the Committee of Council on Education if it was true that there was an intention on the part of the Science and Art Department to publish a catalogue of all known works of art in England and elsewhere, and what had been the cost of the Universal Art Catalogue already published, how many copies of it had been sold, and what amount had been received for such sale? Mr. W. E. Foster replied: In regard to the first question of his hon. friend, he supposed that he alluded to the fact that since 1864 the Department of Science and Art had collected brief notes of objects of art and industrial improvements, copies of which might be useful to museums of art. The first part contained mosaics and stained glass; 250 copies had been printed, and 150 of them had been circulated amongst local schools of art. In regard to the second question, he found upon inquiry that the estimated cost of printing, circulating, and advertising, as stated in the House of Commons returns in 1867, was £8383; but that did not include compilation and editing; 500 copies that had been sold at two guineas each reduced the cost to £7883. The work had not as yet been published in a complete form. It had been conducted as cheaply as possible, and was a work of great value.

LEICESTER-SQUARE.—Captain Dawson-Damer asked the Chief Commissioner of Works whether he was aware that measures were now in progress to let for building purposes the inclosure of Leicester-square; and, if so, if he was prepared to take any steps to preserve that open space in the centre of London for the benefit of the public. Mr. Ayrton said he could only interfere by means of a private bill, and that could only be done according to the standing orders, which required that certain notices should be given. That could only be done for next session. He, however, objected to the Imperial Government being called upon to discharge the duties which properly belonged to the local board, and that case was another instance of the necessity of reforming the local self-government of the metropolis.

BRENT CHURCH, DEVON.

THE parish church of Brent, in South Devon, at present in a very decayed state and much overlaid with whitewash, is about to be completely restored under the direction of Mr. Hine, Plymouth. The building is chiefly Perpendicular, with a tower and some other portions of earlier construction. The chancel contains a Late Decorated sedilia, and an elaborate oak screen, the carving and colour of which will be restored. The roofs and seats throughout will be new, and much of the stonework will be renewed. The chancel and passages are to be paved with tile and slate, and the pulpit is to be of stone. Like so many even of the late churches in the West of England, Brent Church posseses a Norman font, which will be placed near the western entrance, on a granite base cruciform on plan. The cost of the various works will be about £1700.

BUILDING NEWS' SKETCH BOOK.

THE WEST DOORWAY OF ROCHESTER CATHEDRAL.

THIS doorway was erected by Bishop Gundulph. It is formed of five receding arches, with banded shafts, two of which are carved into figures of Henry I. and his Queen Matilda. These statues were very much praised by Flaxman. In the tympanum is a figure of the Saviour, with an open book in one hand and the other raised in the act of benediction, and seated in an elongated aureole supported by two angels and with the emblems of the Four Evangelists at the sides. Below are small figures of the Apostles, few of which are entire; the head of the Saviour is quite gone and also that of the Queen. The capitals of the shafts and the bands of ornament about them are all rich and curious.

THOS. GREENSTED.

WEST WINDOW, CHURCH OF S. PETER, NORTHAMPTON

THE prettyand interesting little Norman church at Northampton, dedicated to S. Peter (from which one of the sketches illustrated this week is taken) is situated a little distance from the West Bridge, and near what few remains there are of the castle. In was no doubt founded by Simon de St. Liz, Earl of Northampton, though there is no record left us of who the founder really was or the time of its erection, but "Bridges" tells us he (Simon de St. Liz) gave the rectory to the Priory of S. Andrew. Mr. Britton has been led to assign 1110 as the date of its erection, but from the rich character of its detail it appears to be much later. It consists of nave, chancel, north and south aisles, and tower. The enriched arch (the subject of my sketch) on the west end of tower, once surrounded the head of the west door, for "Bridges" speaks of some neat tracery work that encircles the western door. This door was blocked up and the present window inserted when the tower was raised in the 14th century. "It was the privilege of this church that a person accused of any crime, intending to clear himself by canonical purgation, should do it there and in no other place of the town, having first performed his vigil and prayer in the said church the evening before." ("'Bridges' Antiq.")

THOMAS GARRATT.

Northampton, June 13 1870.

The joiners of Dusseldorf are at present on strike.

Furniture & Decoration.

ON THE USE AND ABUSE OF ORNAMENT AND COLOUR IN THEIR APPLICATION TO HOUSE DECORATION.

(*Continued from page* 457.)

THERE has been of late a very considerable improvement made in the manner of treatment adopted in the decoration of our dining and drawing-rooms. It used to be the fashion in large houses—and there are many examples to be seen now—to have one room blue, another crimson, and another green. The walls would be painted or hung with blue or crimson, as the case might be, and the cornice would be painted with graduated tints of the same colour, getting lighter as they approached the ceiling, which would be a tint of the same colour, or else white, a style of treatment without a single redeeming feature, showing an utter ignorance of the laws of colour and of its application. We are quite aware of the fact that there are many examples of blue drawing-rooms, yellow drawing-rooms, and even black drawing-rooms, but however heretical we may be deemed, and however much custom in high places may have sanctioned the practice, we must still give our vote against such a perversion of colour. We consider the cornice to a room to be designed as a rich fringe or border to the ceiling, and that it should be treated as a portion of the ceiling in decoration, the same not necessarily separating itself from the wall, but sufficiently so as to mark where the wall ends and the cornice or ceiling begins. This may be done effectually and harmoniously without stupidly using the same tints of colour as that of the wall. It has long been held as a matter of faith by many decorators and architects, that the colours in the cornice should match the paper or colour of the paint on the walls, and if they did so so they must be right. Now this is a mistake in principle, in fact, and in practice. Nature gives us the truest lesson in that respect. The flowers are not the colour of the grass, nor is the sky the colour of the earth, yet perfect harmony results. Depend upon it, whatever colour the walls of a room may be, that we have quite enough of that colour in the room, and that instead of adding to the quantities by painting cornice and ceiling in tints of the same colour, we want as much as we can get of the other two *primary* colours in compensation in order to produce harmony. Graduated tints are necessary, and, in fact, indispensable in the colouring of a cornice or ceiling; but they should be a graduation of harmonious tints, heaviest at the bottom, next the wall, and lightest next the flat of ceiling; this is necessary in order to give height and apparent weight. Most of the great styles of decorative art are founded upon this principle, and it is the great lesson taught by Nature. Our foreground is strong, distinct, and clearly defined, the middle distance less so—so it graduates until the distant hills melt away into the ethereal blue of space; but what a countless number of shades, tints, and hues of colour between us and the extreme distance!—and except our colouring assimilates to this we shall fall far short of harmony. Let us take a blue drawing-room as an example of this ridiculous style of colouring. We have one vividly before us now, done by one of the oldest and most respectable firms in the kingdom. Its walls are thrown into panels, the mouldings of which are gilt in matt and burnish; the panels and stiles are flatted in two tints of blue grey. The doors and window shutters are also painted in two tints of blue grey. The mouldings and astragal beads gilt. A gold moulding also runs up each angle of the room (a practice we cannot but condemn), and one gilt on the skirting, which is, of course, blue. The bottom member of the cornice is of a little lighter shade of blue; the same colour is graduated, one member after another, into the ceiling, which is white, with a gold moulding and corners in relief. The window curtains, covers of chairs, and ottomans, are of a similar tone of blue, with gold trimming. Can anything be more absurd than such treatment? The decorator had an idea that blue and gold went well together, but blue and gold, *ad infinitum*, is rather too much of a good thing. Notwithstanding the gold, the effect of such a room on the beholder is like going into a cold bath in the depth of winter—chills one to the bone, and, in common parlance, gives one "the blues." It is a law of colour, true under all circumstances, that no harmony can result when there is an absence of one of the primary colours, either in its purity or in combination with other colours, and although in what is called a blue room there may not be, and, indeed, it is scarcely possible to make a pure yellow or a pure blue that is without some portion of red in both, yet in the example described, the preponderance of the blue is so great that it amounts to the absence of red; consequently, there cannot be harmony. In the same house is a crimson room. A dark crimson flock paper on the walls, deep red in the cornice, with gold mouldings without stint—if anything, still more horrible than the blue room—a sea of gory red, enough to conjure up thoughts of violent deeds and red-hot fires.

There is another style of colouring, which may justly be called the antithesis of the above, and although not so objectionable in practice, has many faults which a thorough knowledge of colour can only correct. We may aptly term it the mud colour style of colouring, seeing that it is muddy to begin with and muddy at the finish. One of our most distinguished architects is an eminent disciple of this style, and although his architectural drawings may be called pictures in the truest sense of the word, being exquisitely drawn and coloured, he seems to be entirely abroad in the handling of large masses of colour. His colouring is composed of drabs, dirty yellows, buffs, stone colours, and browns. With every tint of colour, however delicate, whether pink, cream, or grey, he must have green mixed, to destroy their pureness, and reduce them all to his favourite mud colour. He has many followers and slavish imitators in this practice. Now we cannot account for this perversion of taste. Whether it is that they are afraid to use pure tints, and fly to these mud colours for comparative safety, or whether they say, with the gentleman referred to, "I hate pure colour"—some people hate the light, and prefer darkness—we don't approve of their taste. It does not necessarily follow that in order to produce harmony and repose, we must discard pure tints, and use only those which are made dull. There is an evident poverty of resource and a dirtiness in the appearance of such works we cannot too strongly condemn. Let it not be supposed that we object to the use of tertiary colours; on the contrary, we do not well see how any composition can be thoroughly harmonious without them, but what we insist upon is purity of tone. It is not necessary to muddy each colour—for instance, if we mix Indian red and white together we may produce any number of shades of a quiet pink, having a faint purple hue, very useful in large or small surfaces. If we add either blue or black to the same, we do not thereby injure the pureness of its tone; we merely reduce the red, and the tints of colour thus produced are in combination quite as pure as although different from the first. But if we add yellow or umber we should at once dirty the colour and make it muddy. Again, if we make a cream colour or light buff from Oxford ochre or chrome yellow and vermilion, with white of course, we have a pure tint, as red and yellow do not dirty each other, but if we add green or blue we muddy it at once. Dull tertiaries should scarcely ever be used except on large surfaces, such as walls. What we contend for is the fact that a much more pleasing effect can be got by a judicious use of pure tint of colour than by using mud colours, however cleverly combined, and that quietness and repose may be better attained by the former than by the latter, for there is a beauty in its very pureness, like the beauty of the hedgerows after a genial spring shower, utterly unattainable by the mud process. Much time and talent are wasted occasionally in an attempt to imitate in paint damask and other watered fabrics on the walls of rooms. This is done in several ways—by stencil plates, by combing with large-toothed combs and megilp composition; by stopping out, by contrast of dead and bright surfaces, and in the manipulation being elaborate and expensive. All these attempts we consider fanciful and far-fetched—as a means of decoration not worth the trouble and expense of their doing, and certainly not equal in finish and effect to the same class of things manufactured by the paper stainer at one-twentieth of the cost.

ERRATA.—In last week's article on this subject, p. 457, col. 1. line 38 from top, insert the word "*green*" before "Indian red," &c. In same column, line 18 from bottom, for "sides" read "*stiles*." Also, in letter on "Woods and Marbles," p. 459, col. 2, line 8 from top, for "past and present" read "*best and purest*." For "worse," line 7 from end of letter, read "*wiser*."

EXETER DIOCESAN ARCHITECTURAL SOCIETY.

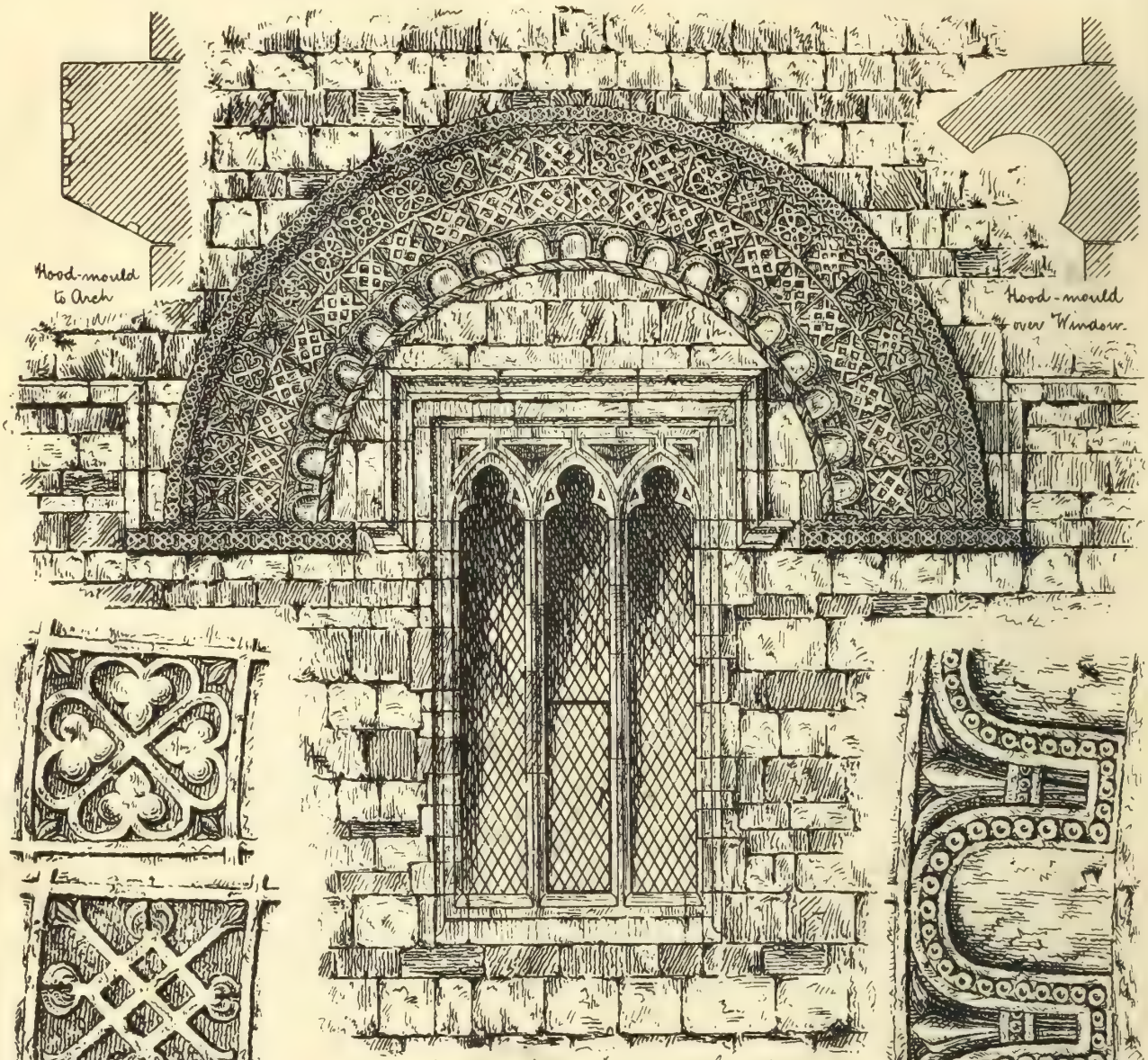
THE annual meeting of this Society was held on Tuesday week, the Hon. and Rev. C. H. Courtenay, President, in the chair. The report read by the Secretary dealt at some length with the proposed restoration of the cathedral (as noticed on p. 466). The financial statement showed that the balance in hand on the 31st December, 1868, was £47 19s. 7d.; annual subscriptions received for 1869, £98 14s.; arrears of subscriptions received, £23 2s.; received for sale of "Transactions," £7 14s.; subscription for 1870, £1 1s.; total, £178 10s. 7d.. Expenditure, £48 13s., including £30 grant towards restoration of churches; balance in hand at close of the year, £129 17s. 7d.

On the motion of the Rev. Prebendary HARRIS, the following officers were elected:—President, Mr. John Garratt; Vice-Presidents, Mr. William Barnes, Mr. Arthur Kelly, Rev. Dr. Cornish, and Rev. Prebendary Tatham. All the other officers and the committee, were re-elected.

After some discussion with respect to the controversy between the Committee and Mr. Scott (see p. 467),

Mr. ASHWORTH read a paper "On the Origin of Spire Lights." He assumed that these ornaments, being in form gabled windows, seemed in a manner to violate the rule that in ancient church architecture no feature is found without its being of especial use, for the interiors of stone spires never required lighting. He contended that these ornamented pyramids were produced in imitation and commemoration of the ancient octagonal Pharos tower, the most primitive lighthouse of the Greeks and Romans; that, symbolical of the beacon-tower indicating to the tempest-tossed mariner the position of rock or headland, the tapering spire reared itself high above the level of the city's turmoil and temptations, to lead the wayfarer's mind away from worldly things, and clear of the snares that beset him in the streets. A few words were said on the stone lanterns which surmount some English church towers; that at Boston, in Lincolnshire, seems to have been constructed as a sea-mark for the vessels entering the port, well lighted, of course, at night.

A DANGEROUS DEFECT IN MODERN HOUSE BUILDING.—A correspondent complains, and justly, of a serious defect in modern house-building. In the majority of new houses, he says, the roof affords no means of escape in the event of fire, "and that is an event which, thanks to the excessive ease with which fire is now obtained, and the excessive carelessness of many domestics, is of much too frequent occurrence to be talked of as unlikely." It has been asked whether it does not come within the province of that useful body, the Royal Society for the Prevention of Life from Fire, to endeavour to obtain legislation on the subject, but it is said that there are great difficulties in the way of getting the law-makers to interfere. Does not the Building Act touch the matter? If not, is it advisable that it should?

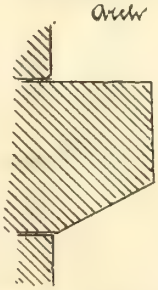


Elevation, shewing enrichment of Arch.

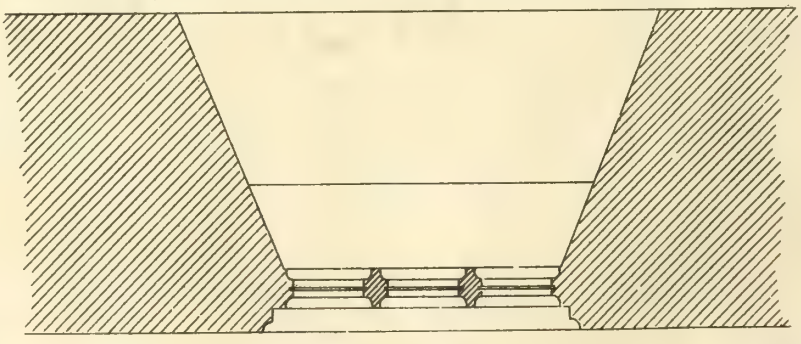
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Enrichments of Arch

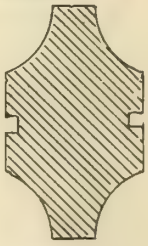
Enrichment of Arch



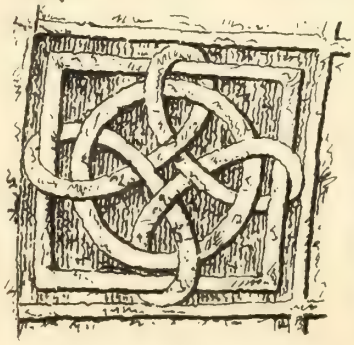
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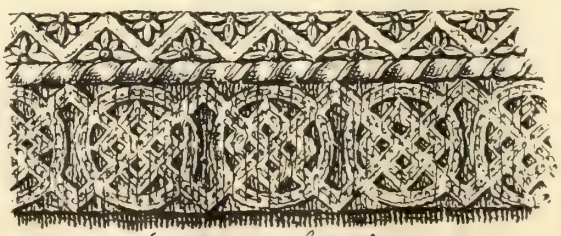


Plan of Window.

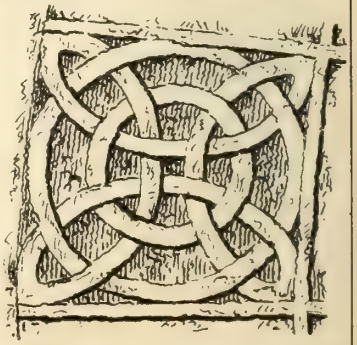


Mullion





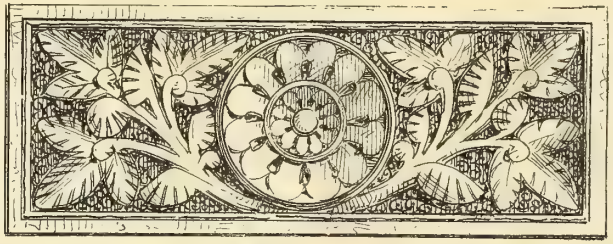
Enrichments of Arch.

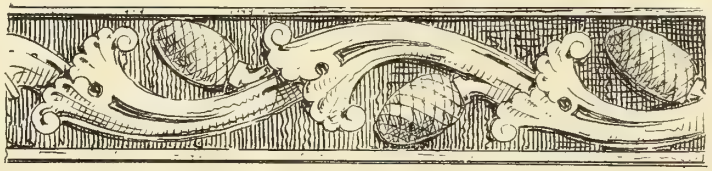


West Window, Church of S. Peter, Northampton. - G. Pace del.

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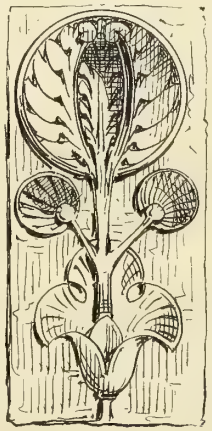










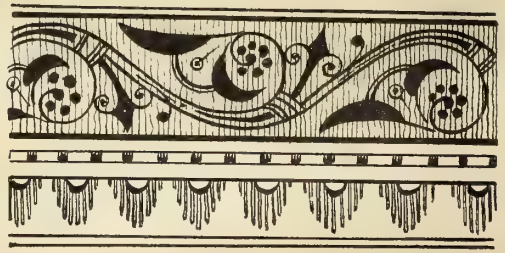


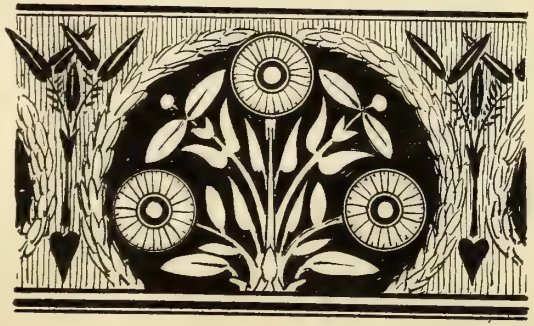
















MODERN—INDIAN—ORNAMENT—DRAWN—BY—OWEN—W—DAVIS

Owen W. Davis, del et lith

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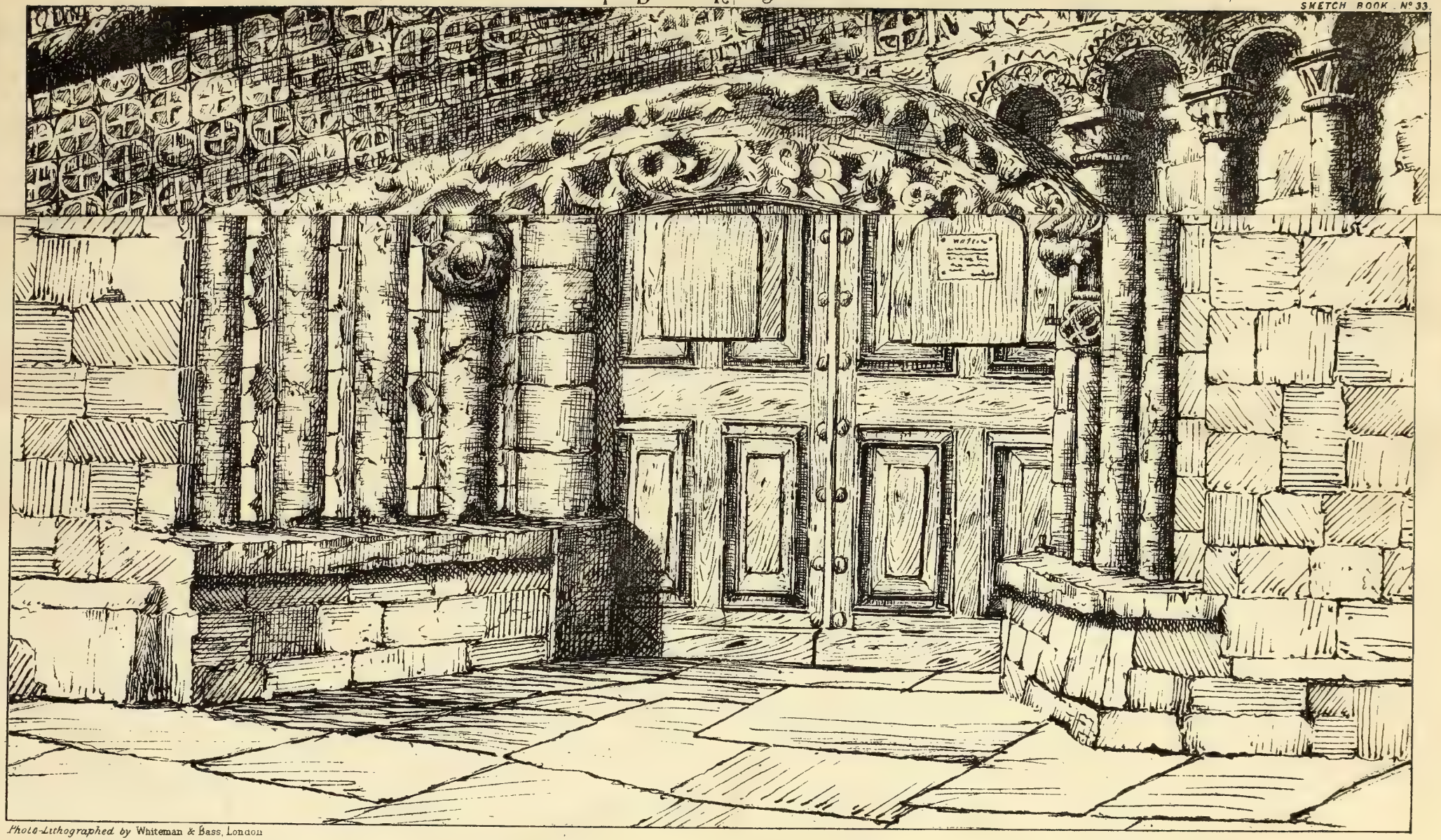


Photo-Lithographed by Whiteman & Bass, London

WEST DOORWAY, ROCHESTER CATHEDRAL.

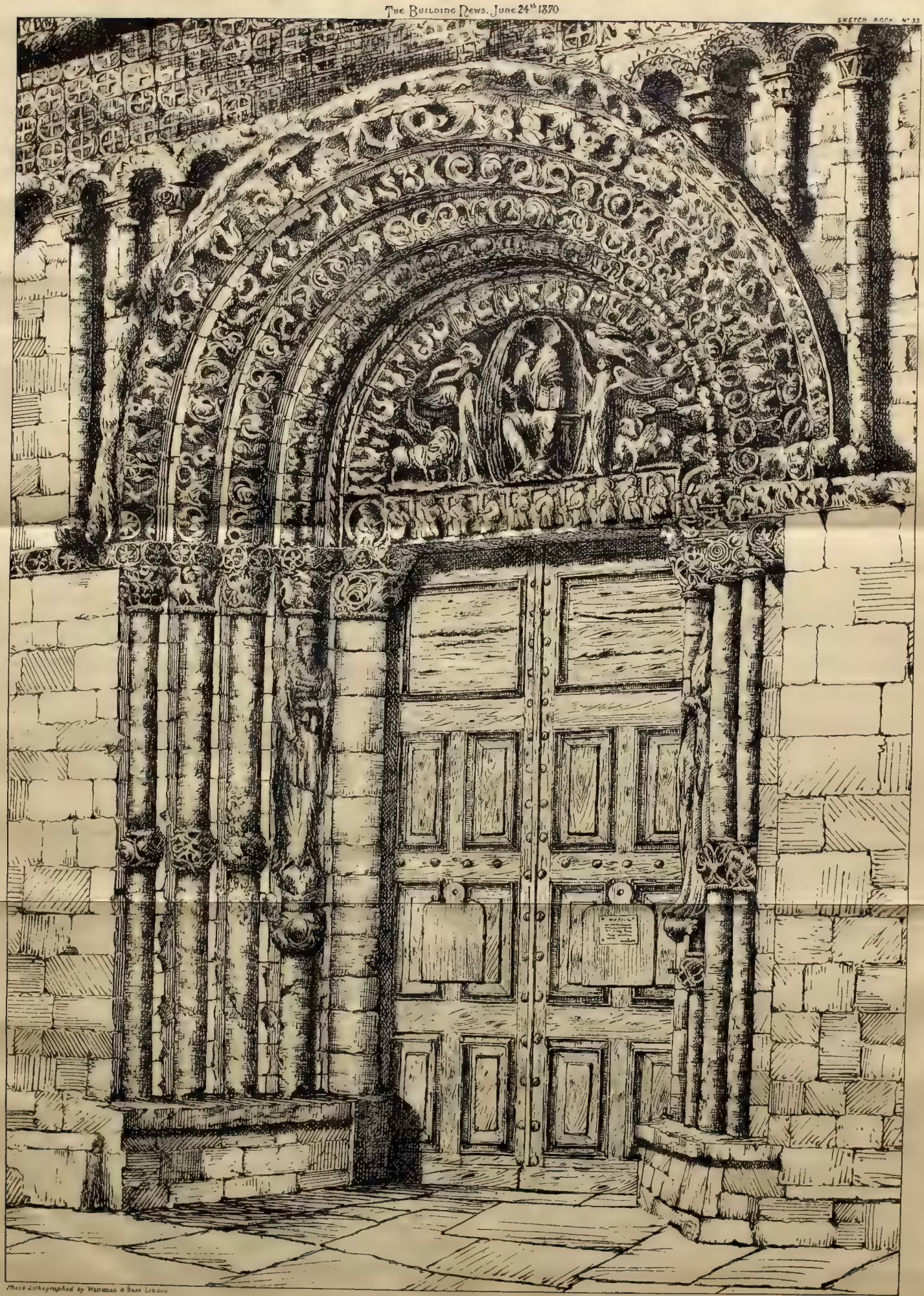


Photo-Lithographed by Whiteman & Bass London

WEST DOORWAY, ROCHESTER CATHEDRAL.

BRIEF CHAPTERS ON BRITISH CARPENTRY.

By THOMAS MORRIS.

(*Continued from page* 456.)

IT is here proposed to look at carpentry known to be closely connected with the most eminent ecclesiastic England has in any age produced, without excepting her only pope (Adrian IV., A.D. 1154-9). Far above all others in celebrity stands Thomas Wolsey of Ipswich, born 1471. Moved at a very early age from a country grammar school to Magdalene College, Oxford, he became a bachelor in that university, "the boy Bachelor" of Arts, in 1485, He soon obtained a fellowship, and was bursar of his college some years later (1498).

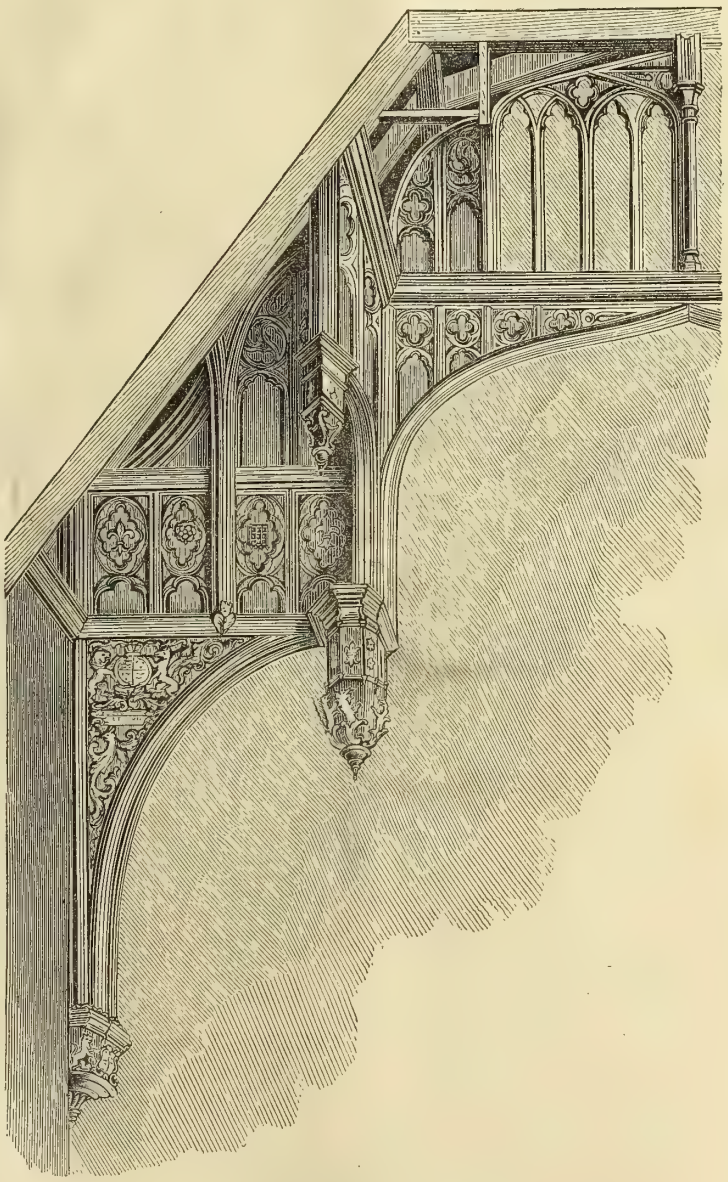
Oxford, a cluster of splendid edifices, was calculated to inspire a cultivated and ardent mind with the passionate admiration for architecture displayed by many Oxford men, and largely entertained by Wolsey. Magdalene itself, fresh from the munificent hand of William of Waynflete, claimed admiration even in Oxford, and was, indeed, so far immature as to afford exercise for Wolsey's attention to the elegantly-proportioned chapel tower with which his name is sometimes associated.

Among his college pupils were the sons of the Marquis of Dorset, and from that nobleman he received the benefice of Lymington, his first preferment, in the year 1500. He forthwith busied himself in repairing the church and parsonage, but was presently made domestic chaplain to the Archbishop of Canterbury, upon whose death he went over to Sir John Nanfan, Treasurer of Calais, by whom he was commended to Henry VII., and so commenced his court life as King's chaplain, an office that was soon followed by the Deanery of Lincoln, together with the prebends of Walton-Brinhold and Stow. He was consequently a man of established position, reputation, and wealth before Henry VIII. ascended the throne, though with the new reign his second stage of extraordinary advancement may be said to have begun. As Canon of Windsor, Registrar and then Chancellor of the Order of the Garter; as Prebendary and Dean of York, Dean of Hereford, and Precentor of S. Paul's, he took rapid steps, to be followed by others of greater importance after the King's return from his French campaign, when Wolsey entered upon State administration. This was in 1513, the year in which he became Bishop of Tournay, In the next he received the bishopric of Lincoln and the archbishopric of York. 1515 brought the Cardinal's hat and the Chancellorship. In 1519 his prospect of the Papacy was fair, and though in the event unsucessful, he was by the conciliatory policy of his fortunate competitor made Legate, with powers in this country almost as large. By administering the see of Bath and Wells, holding in commendam the rich Abbey of S. Alban, and obtaining in succession the bishoprics of Durham and Winchester, besides the receipt of foreign honours and emoluments, his wealth outgrew all safe proportions for a subject. Learned, polished, and sumptuously arrayed, Wolsey was fitted to embellish any great court, and his natural proneness to festivity and show seemed especially suited to that of Henry VIII. But in his love for gorgeous furniture, equipage, and retinue he surpassed, and in surpassing offended, the susceptible and jealous monarch he had almost forgotten to esteem as a master. But he was a great and liberal patron of literature, possessed a fine taste in art, and even when most encompassed by luxury was intent on the advancement of science. He was a warm admirer of architecture, and architecture, as usual, makes to him the most ample and enduring return. His plans have the reputation of elegance, and in their accomplishment he was utterly unsparing. The strongest of all pleas in his favour is that if he appeared selfish in amassing wealth, he freely disbursed it in noble foundations that unceasingly serve the cause of knowledge and civilisation :—

> Ever witness for him,
> Those twins of learning that he raised in you
> Ipswich and Oxford! One of which fell with him,
> Unwilling to outlive the good that did it.
> The other, though unfinished, yet so famous,
> So excellent in art, and still so rising,
> That Christendom shall ever speak his virtue.
>
> Henry VIII., act iv., scene ii.

It is, however, as patent as it is lamentable that Wolsey's architectural monuments are also memorials of the danger he was incurring by their display. Hampton Court was begun in 1514, before he was Cardinal, and when it is considered that much of the present plan consists of additions by later possessors it may be assumed that the style, rather than the extent of the palace, was the cause of that envy he felt it a matter of policy to appease by presenting it to the King. This was in 1526, when the shade of coming evil may have been apparent to the Cardinal. He, however, appears to have been in occupation till 1527, when he received the French ambassadors there.

During Wolsey's later years at Hampton Court he was busily engaged in the institution of Christ Church, Oxford. Of this princely establishment Dr. Ingram says :— "Its architecture exhibits specimens of almost every age, from the Saxon times to our own. In its structure at once a cathedral and a college, it unites in itself the offices and duties peculiar to each, while as a seat of literary instruction it has earned itself a name throughout the civilised world which an abundant harvest during many centuries of men eminent in every department of Church and State could not fail to produce. As a collegiate establishment and professed nursery of learning, Christ Church may be said to have had no fewer than three distinct foundations—namely, in the years 1525, 1532, and 1545. Although the two last of these bear the more imposing weight of a royal name, yet we ought never to forget that the merit of originating the whole, and therefore of really producing all those beneficial effects which have since flowed from the institution, is wholly due to the vigorous mind and munificent spirit of Cardinal Wolsey." The influence of the same intelligence was freely extended to architecture, and architecture is not faintly reflected by the more finished works in carpentry. It is necessary to revert for a moment to the wonderful degree to which admiration was excited by the introduction of fan groining. It was imitated everywhere, and though most highly esteemed at Cambridge, where its glorious success was first attained, the founder of Christ Church had direct intercourse with the Sister University. Impatient of builders' delays, he commenced his educational work in lodgings, culling the sharpest wits and the most promising genius from every quarter, some being invited from Cambridge. The other Royal chapels of Westminster and Windsor having ceilings alike gorgeous with their prototype were, however, on the full tide of popularity. The ribs and transoms and grounds executed in stone were amazingly similar to frames of stiles and rails and panels in wood. The pendant, though not constructively essential, was a novel and beautiful feature that seemed to create an irresistible desire of imitation. Wolsey's work in the Choir of Oxford Cathedral presents a remarkable instance of such imitation. There is an instance of fan-groining which, for the purpose of description, may be called too narrow for the span, and the nucleus of ribs that might have rested on a capital or corbel next the wall here stands out in a series of dropping pendants. To support



HALL ROOF, HAMPTON COURT.

these pendants and the central ceiling, brackets are thrown out from the walls, and transverse arches are turned over the clerestory windows. Fan-groining crowns the staircase to the Hall of Christ Church, and it crowns the dais oriel within the hall. The roof over the body of the hall is constructed on the bracket principle, similar to that at Westminster School, with greater ornamentation, and with one especial difference. In the earlier examples that have been passed in this review, a space extending from the top of the wall to the rafter was occupied by open spars or ashlar pieces. In later instances the same space was covered by an ornamental band or fascia. We saw this band at Crosby Hall, but there there was no bracket. At Christ Church we see it both on the wall and superadded to the bracket, giving a considerable increase of importance to that feature. The stone corbels from which the brackets rise are not unlike those of Crosby Hall, but the upper member is of Tudor flower in lieu of battlements. From the inner end of each bracket rises a queen-post to the principal rafter, and at that intersection the first longitudinal purlin occurs, with a range of four centered arches and pendants on each side beneath it. Arches are also thrown across from queen to queen, headed by cross struts rising somewhat in the middle. The triangle between this strut and the principal rafters is filted by tracery with a central post, and a boss marks the apex of the arch mouldings.

The windows form an elevated range, as in some other cases, the oriel only coming to the floor; but wainscotting here covers the lower part of the walls that were elsewhere left plain for the reception of tapestry. No greater honour could well be paid to the merit of the Christ Church roof than the adoption of its design for the new hall of the Inner Temple, London, where many of the alumni must recognise its welcome form. It would be difficult to contrive a better, and Mr. Sidney Smirke has set an admirable example of modesty and judgment in the reproduction. Mr. Wilkins obtained, perhaps, more credit for renewing the Crosby Hall roof at Cambridge than for any other contrivance of which he gave that University the advantage. The new roof at the Temple is well given in the *Graphic* newspaper for May 21, 1870, except as to the confusing lines of some diagonal boarding.

The roof at Oxford was erected under Wolsey's immediate sanction, but so much can hardly be said for that at Hampton Court. After presentation to the King, additions were made, but still it is understood upon the Cardinal's plan, and by the original architect—a court architect, it may be presumed—and if not Sir Reginald Bray, at least a talented contemporary. The palace was in high favour with the King and court. Here Edward VI. was born, October 12, 1537, and the marriage with Catherine Parr was celebrated in 1543. The hall was occasionally used as a theatre by Henry VIII., Elizabeth, George I., and George II. The roof ultimately became decayed, and was thoroughly and carefully repaired in 1820.

In the roof at Oxford the older principle of timber framing was followed with tolerable fidelity, as was the case at Eltham. While at Hampton Court, the most complex and elaborate object of the sort we possess, there is a singular blending of open framing, like the great roof at Westminster, and the close casing of Crosby Hall. The Hampton Court example is of fine proportion, 106ft. by 40ft. and this last dimension indicates the carpenter's increased ability to cover wide spans. It is a bracket roof, and the structural timbers are chiefly concealed. Commencing with the carved stone corbels, the brackets they support are moulded on the edge, and charged with royal insignia at the sides. A band of tracery surmounts the jib, and from the front starts the queen-post, dropping into elaborate pendants. Crossing between queen and queen is a level timber, supported by a stilted four-centered arch, and bearing above a plane of open mullions and tracery, finishing against the curvature of the ceiling, which is also ribbed and traceried. Then, longitudinally, there is a range of arches from one queen-post to the other, of a compound trefoil character, dropping pendants at the cusps. This last range of arches is parallel to the side wall, and the length of the jib marks the separating distance. At the mid-length of the jib is another, but secondary, line of arches, and then the casing is made to assume the approximate figure of groining. In the central part there are two lines of carved pendants, and there seems, indeed, to be in all directions curves of the most graceful sweep, floating ornaments, carved emblems at once fanciful and historical, as the initials of Henry and Jane Seymour interlaced with true-love knots. Every appliance, it may be said, had been resorted to for the purpose of clothing this royal specimen of our Gothic roofs with majestic dignity, festive lightness, and all the decorative splendour of its age.

TAR AND OTHER PAVEMENTS.

AT a recent meeting of the British Association of Gas Managers, Mr. T. H. Methven, of Bury St. Edmunds, read a paper on this subject, stating that in most provincial towns there were two important bodies of men—the paving commissioners and the gas directors; the one pledged to keep the rates low, and the other to keep the price as low as would enable them to provide the statutory dividend. As one means of insuring a cheap supply of gas was to create a greater demand, and obtain a better price for the residual products, the author had great pleasure in introducing a subject the adoption of which would be advantageous to both those bodies. In some counties, such as Yorkshire, where stone was abundant, tar pavement would receive but little attention; but in the eastern and home counties, where the same conditions did not exist, tar pavement was a desideratum. It might be made of the ordinary cinder dirt produced in gasworks, of shingle, or of a mixture of both. The material was burnt in heaps like ballast, and when hot was mixed with hot tar. In practice he made a small fire of coke on the ground and covered it with cinder dirt or shingle. When this layer was hot, another was added, and so on, in succession, until a large enough heap had been provided. The tar was boiled in an iron copper, and, when hot, mixed with the hot material from the heap already described, in quantities of two bushels at a time, in about the proportion of one gallon to every bushel of cinder dirt, and slightly less than a gallon for the gravel. It was turned over and over with the shovel until every part of the material had got a covering of tar. He then passed the whole through a sieve with a $\frac{3}{4}$in. mesh, and part of it through another with a $\frac{1}{4}$in. mesh, and put the whole in heaps until required for use. Before the pavement was laid an edging should be provided about 2in. thick, and projecting 2in. above the surface of the ground to be covered, which should be tolerably even. It was advisable to have the ground near the kerb well trodden on or rammed before the pavement was laid, otherwise there would be an unseemly hollow near the kerb. In laying, the rough stuff wss put down first, and rolled until tolerably firm; then the second quantity was put on, and then the third; and when the whole had been levelled, a little of the finest material was sifted on, and a little fine white shingle or Derbyshire spar sprinkled on the top. The whole must be well rolled. The best roller was a water ballast roller, which at first was used without ballast, and well wetted to prevent adhesion of the material, and when the pavement was slightly consolidated the full weight should be applied. For heavy cart traffic the material should be made of shingle. Both descriptions of pavement are laid best and most easily in warm weather, and should be rolled when the sun has warmed it well. Though apparently a simple manufacture, there was a little difficulty in ascertaining the proportion of tar to gravel and cinder dirt. He could not recommend this pavement too much, as it was cheap, wore well, and could be easily repaired. The colour, which now could be made to equal York flag, and the smell for some time after it was laid, were the only objections to its use. It could be laid with a good profit in any district at 1s. 4d. per square yard, and besides being a boon to the public, who must otherwise walk on gravel, was a great advantage to gas companies, providing a remunerative outlet for their tar, which often otherwise must be sold at a low price to distant distillers. A paragraph in the *Times* stated that it was proposed to pave the streets of London with stone laid in asphalt instead of lime grout. This was just a mere systematic application of the above described plan, for the tar being boiled and thrown on hot, does become an elastic asphalt.

In the discussion which followed the reading of the paper,

Mr. LIVESEY said this was a subject on which they wanted information. He had been trying for years to get a good tar pavement, but had not succeeded. Mr. Methven had explaind so clearly the right way to do it that he and many others would now be enabled to succeed.

Mr. IRON said her Majesty's Government had been in the habit of using tar pavement to a very large extent. The material used in London is asphalt; they get Seyssel asphalt from Italy, and that was a rather better material than tar.

Mr. ANDERSON said he was so much pleased with what he saw at Nottingham that he determined to try it for a considerable quantity of pavement he had to do at their own gasworks at Dover. They wrote to Nottingham and got a man who had a thorough experience of that kind of work. The matter was left in his hands, and he made both foot-paving and cart-road paving over their whole works. They were quite satisfied with it, and would never give it up. Dover had hitherto been paved with small pebbles, which were very disagreeable things to walk upon. Some gentlemen whom he had heard had done penance upon peas could hardly be in worse condition than ladies and gentlemen on the pure clean pebbles in Dover. There was no earthy matter to consolidate them, and they were peas at the beginning and peas at the end of the chapter. He had frequently called the attention of gentlemen of influence to the state of the pavement, mentioning what the gas company was doing, and asked permission to do a part of a public pavement where a new church had been built. They obtained permission, and the work proved so satisfactory that next year the same person was engaged to do nearly the whole of the paving of the side paths that had not hitherto been paved, and, so far as he could judge, it was perfectly satisfactory. It was a capital paving, and a paving that required each one of them in their several localities to take some trouble in introducing. It was very difficult to get public bodies to move, but by incessant application they could overcome their inertia. For cart-road paving this system was equally applicable. In making an experiment of this kind they should insist upon having a concrete foundation at the beginning. The history of all good road making depended upon a good foundation. They might make a road as good as they liked to the surface, but if the bottom substratum was apt to yield the chances were hollows would be formed, water would get in, and when the frost came it would expand that water and destroy the road. The best system in the world might be condemned through want of proper appliances in the execution of it. The Seyssell asphalt was a very extraordinary substance. The streets of Paris had been for a great number of years largely paved with that substance. and last year he saw them doing it on what appeared to be a perfectly novel plan. Formerly they used to put it on in a liquid form, but now they had discovered that the same matter ground into fine powder and heated to such a heat as could be well borne in the hand, put down in the shape of that dry powder in the warm state and rolled, became in a couple of hours so hard that carriages could pass over it. All these pavements were, in his opinion, far superior to stone, even if they got stone cheaper. They were agreeable to walk upon. In very warm weather they would yield a little, but if properly executed they did not melt sufficiently to form marks that the next foot-mark did not obliterate. No harm was done to the pavement when a good solid foundation was given. One agreeable feature in the pavement was that it dried immediately almost after a shower of rain. The water ran off, and, as soon as ever the atmosphere became of a dry character, the pavement was quite dry. This was a matter they should

each take up in their several localities, because it was not only a great convenience to the towns, but was a mode of disposing of a waste product which was not always profitable.

Mr. CHURCH said Mr. Methven stated that tar paving was more economical than stone. No evidence was before them in support of the statement, and he doubted its accuracy. He had something to do with public bodies in these matters, and they always found York pavement was decidedly the cheapest and most durable pavement that could be used. There was an immense amount of friction on pavement generally, and even with York pavement it was astonishing how soon it wore. Then the appearance of the tar pavement was very objectionable. A town covered with tar pavement presented a most sombre and unpleasant appearance. He did not think people who lived in towns paved in that manner could be at all of a sanguine temperament. (Laughter.) Another objection was the difficulty of repairing, and as persons connected with gasometers frequently disturbed the roads, to the annoyance of the public, that was an important question. He had seen bricks tried of various kinds, but in the end always found that such pavement wore out in one-third of the time of stone. Seyssel asphalt was remarkable stuff, but it was quite as dear as stone. It was found in practice that where they substituted anything equal to stone it was quite as expensive. He questioned whether tar pavement would be more economical in the end, because duration must be considered as well as first cost.

The PRESIDENT: Can you give us any particulars of the duration of the different pavements, stones and tar?

Mr. CHURCH said ordinary stone pavement lasts about 10 years, *i. e.*, it required taking up and dressing, and could be then relaid. Bricks would last about half that time. He believed asphalt was fully equal to stone. A very good specimen of asphalt was that laid down on the French system near the Bank, and certainly so far as it had gone it was a success. There was a difficulty lately with the telegraph people. They had to carry their lines of telegraph there, and they were trying, as far as they could, to get out of the road, because there was a difficulty in repairing it.

Mr. DUNNING said that at Middlesbrough the cost of flagging with Yorkshire stone had been from 4s. 8d. to 5s. a superficial yard. The cost of the Staffordshire bricks was 3s. 6d. The cost of the tar pavement, which had been made very much in the same way as described by Mr. Anderson, was 1s. Those were prices that had been in vogue for the last fifteen years. He laid down tar pavement in one locality ten years ago, and to all appearance it was as good now as the first year it was laid down, with this slight exception: it was an elevated footpath supported by a low retaining wall, and that had given a little, so that a channel had formed just inside the kerbstone. The whole of the rest of the asphalt was as good as it was the first day it was laid down. They had not experienced any difficulty about the pipes. It certainly required very great care on the part of the men in repairing it, but if they were careful the repair was quite equal to that of flags or bricks, because in nine cases out of ten in taking up and laying down flags they were chipped, and they seldom got the same good joint with flag and brick that they did with asphalt. With regard to telegraph wires there could be no difficulty, because they might lay the wires under the bed of the kerbstone. The 1s. a yard left a very good profit and they could judge whether it was not to their advantage to encourage the making of tar pavement.

Mr. MEADE said that they in the south had a still better case than the last speaker. In this part of the country the York flagging cost very nearly 9s. the square yard; so that tar paving was very much cheaper in proportion than in Middlesbrough.

Mr. JONES said the pavement at Dover cost 10d. a yard when made. That included cartage of material, and if the material was close at hand they could do it for 6d. or 8d. a yard. The piece Mr. Anderson referred to was put down three years ago, and was as good as it was when first put down. A practical stonemason said he was perfectly satisfied that tar pavement would last very much longer than flagging. It was always desirable to distil the tar so as to take off the corrosive oils, otherwise it would not have the diffusive property which was necessary.

Mr. BROADHEAD of Grimsby, said tar pavement had been laid down there at 13½d. per yard, while flagging cost 4s. 6d. They were now laying down several miles of tar pavement. It was prepared in the following way:—The contractor got the gravel from the coast, sifted it, and took out the rough gravel; that was put into crude tar. He then went to the gasworks and the factories of the town and got all their ashes; these were put through a sieve, then put into ovens, and then mixed with the crude tar. He picked the footpaths (kerbed with 4in. kerbs) up about 2in. deep, laid on the rough gravel that has been already in tar, rolled that, and then put on the fine ashes that had been saturated with tar. This was rolled down, and was then sprinkled with Derbyshire spar. A pavement costing 13½d., and lasting ten years, was economical in towns where flagging costs 4s. 6d. At one time they had a difficulty in getting ½d. a gallon for the tar; the contractor now gave 3s. 6d. per barrel of 26 gallons, and they could get 1½d. for the surplus quantity from the distillers.

Mr. LIVESEY, of Ventnor, said he was town surveyor of that place, and was well acquainted with the Seyssel asphalt. Tar was a very valuable material for pavment, and its success would depend very much upon the manner in which it was mixed and laid; and the nearer they could assimilate its condition when laid to that of the Seyssel asphalt the greater would be its success. The asphalt was obtained from a limestone in the Jura mountains. The limestone was thoroughly saturated with this kind of mineral tar and it was all ground down together. If grit or sand were introduced into tar pavement along with shingle it would render it of a much more binding character. There was a larger application of the asphelt in Trafalgar-square, and the wear was almost imperceptible. If managers and engineers of gasworks were to study that material a little more, and the mode of obtaining and using it, the experience so gained would be of great advantage in introducing tar pavement, which he should like to see adopted universally.

Mr. ANDERSON said they were favoured with the presence of Mr. Ellison, of the Paris Gasworks, who wished him to say a few words in more detailed explanation of what had been stated about the Paris asphalt. Mr. Church fancied that people who could admire dark pavement must be of a sombre disposition. He joined issue on that proposition, for it appeared to him that the man who could not enjoy the sombre aspect of the pavement must be too sombre, and that the man who could, had more elasticity in his nature than the man who could not. But it was not necessary that the paving should have this sombre character. He had seen it beautifully granitified, if he might so say, on the top by fine particles of Derbyshire spar, and whether sombre or not, when it had the spar upon it it was a sparkling pavement, far superior to anything to be got in the way of stone. Passing from that Mr. Ellison wished it to be stated that the asphalt in the streets of Paris was not the pure asphalt which was put down on the foot-pavements; but the whole of the limestone with the asphalt combined was ground up into a fine powder and distributed in the way mentioned, and instead of being rolled was stamped with warm stampers.

Mr. METHVEN, in reply, said cart roads could be made by using large stones only, about the size of walnuts, without any intermixture of cinder dust at all. Sometimes they might fail in mixing it, but it was a matter of experience. He had a road laid for two or three years with this tar pavement over which he had carted between 4000 and 5000 tons a year, and it stood very well. Wherever there were gasworks they could make a very good foot-pavement merely with the breeze, simply heating it and mixing it with tar. That did not always answer when there was a hot exposure, but some shingle mixed with it would make it hard. Mr. Church had referred to the want of evidence as to its durability, but after what the speakers had said he must be satisfied on that point. As to the question of repairing, this was very easily done. They only wanted the stuff, and then any labourer could do it if it was left a little higher than the old pavement; so that allowance was made for the settlement of the material, in a short time they would not be able to discover the joint. There was no difficulty in mending it, because the stuff could be kept on the work for months without receiving any serious injury.

Mr. FOSTER (Secretary to the Society of Arts) said her Majesty's Commission for the International Exhibition to take place in 1871 were anxious that he should bring before this meeting the nature of that exhibition, and hoped that they might have the aid and assistance of gentlemen belonging to this Association in making that exhibition as successful as possible. In the division of manufactures which included machinery and raw materials, there was a division of scientific inventions and new discoveries of all kinds. It was hoped that some gentlemen connected with their manufacture would bring forward at that exhibition some of the various interesting inventions which were continually being made in gas manufacture.

THE ARCHITECTURAL ALLIANCE.

THE ninth annual meeting of the above Alliance was held on Wednesday last, at the rooms of the Architectural Association, 9, Conduit Street. The President, T. ROGER SMITH, F.I.B.A., in the chair. The following delegates were present, Mr. Thomas, Mr. Rickman, F.S.A., (Hon. Sec. of the Alliance); Mr. J. D. Mathews, A.I.B.A.; and Mr. R. Phené Spiers, A.I.B.A., as representatives of the London Architectural Association. Mr. J. R. Botham, F.I.B.A., of the Birmingham Architectural Society; Mr. H. H. Statham, Jun., of the Liverpool Architectural Society, Mr. Thomas Oliver, F.I.B.A., of the Northern Architectural Association, and Mr. T. C. Hine (Vice-President of the Alliance), representing the Nottingham Architectural Association. Mr. Drew, of the Royal Institute of Architects of Ireland, was also present as a visitor.

The SECRETARY having read the minutes of the last meeting, they were duly confirmed.

Mr. Rickman then introduced Mr. Drew as a visitor from the Dublin Institute of Architects, with whom the Alliance had been in correspondence with a view to the Institute joining the Alliance.

Mr. DREW said he had no formal authority on the present occasion to represent the Institute, but he had pleasure in being present. The state of architectural law in Ireland was very unsatisfactory, and was gradually becoming worse. He thought the Alliance might materially assist them in effecting some reformation. He knew that many members of the Institute were anxious to be working with the Alliance as soon as possible, as it was possible that some cases might soon come before the Courts seriously involving the interests of the profession, and they thought it would be desirable to get some of the delegates of the Alliance to attend, and give evidence as to the usage of the profession in other places. At present they could get only evidence as to Irish custom.

The CHAIRMAN said that Mr. Drew being in communication with the Alliance, might rely upon receiving what assistance the Alliance could afford the Institute until they formally became members of the Alliance, and this would doubtless answer all practical purposes.

Mr. SPIERS then drew the attention of the delegates to the desirability of the Royal Institute of British Architects co-operating in some way with the Alliance, so that the operations of the Alliance might be yearly brought before the Council of the Institute. He thought a great mutual benefit would result from such a co-operation. There were sometimes questions raised before the Institute with reference to which the Alliance were able to get information of a serviceable character, and there were sometimes important questions arising in the provinces upon which it would be desirable to get the opinion of the Institute, and thus the Institute and the Alliance might assist each other.

After some discussion the following resolution was agreed to:—"That the Royal Institute of British Architects be invited to meet the delegates of the Architectural Alliance, consisting of the following allied societies (mentioning their names) once a year at their annual meetings."

The SECRETARY then read the following report of the officers of the Alliance, and it was unanimously received and ordered to be placed upon the minutes:—

"Since the annual meeting of the delegates in 1869, the officers of the Architectural Alliance have not been called upon to take active measures in its name, either on any of those exceptional occasions which are left within their discretion by the constitution of the society, or for any other special purpose.

"It will be remembered that at the meeting in 1869, it was arranged that they should represent

the Alliance in any conference or joint committee which could be agreed upon between any bodies representing the profession of Architecture, the General Builders' Association, and the London Builders' Association. But they have not been called upon to take part in any such conference, they believe that the difficulties in the way of arriving at any common understanding as to what is the fittest basis for a building contract have been found very great, and may probably prove insurmountable. It is easy to understand that the nature of the business which is to form the subject of a building contract varies widely, that the circumstances of no two contracts are precisely alike, and especially that the degree of mutual confidence between the parties is exceedingly different in different cases. They do not therefore wonder at its having proved very difficult, where discussion has taken place, to arrive at unanimity, and they dare not hope that very great progress can be expected from such attempts. On this head it may be right to add that it is understood that the subject of conditions of contract has been receiving much attention in London during the past year, but no definite results have been announced as having been arrived at. It is a question worth consideration whether some individual body of architects might not with advantage issue, as approved by it, a series of conditions of contract suited to average circumstances, in the hope that they might be frequently followed. Such an undertaking would perhaps prove more difficult for a scattered body like the Alliance than for a single society, but there can be no question that it might be extremely serviceable if well carried out.

"The position of Government in relation to architects has been very far from satisfactory; the recent discussions with regard to the employment of Mr. Barry, and his right to retain his father's plans, have been observed with regret, and the officers of the Alliance are glad that some of the Allied Societies have expressed decidedly the results of their experience in relation to the ownership of drawings. They hope that one result of the meeting of 1870 may be to arrive at some agreement upon the custom, the law, and the expediency of an architect retaining possession of his plans. With regard to Government action, both in removing such a building as the Palace of Westminster from the care of an educated architect and placing it under the charge of a department presided over by an officer of engineers, and also in placing works such as the New Post Office in the hands of departmental officers in preference to employing practising architects, while there is matter for regret and possibly for dignified protest, they do not see that any action can be usefully taken by the Alliance.

"The information received from the Allied Societies on the subject of Architectural Education has been supplemented by one, and only one additional report, but the officers are happy to be able to announce that more than one important step has been taken in the metropolis during the past year. The Architectural Art Classes established under the joint conduct of the Institute, the Association, and the Architectural Museum, have begun work in the Architectural Museum, Bowling-street, and the prospect before them seems a very satisfactory one. The re-opening of the Architectural Museum, in premises of its own in the heart of Westminster, is an event of great importance in its bearing upon architectural education, and places within the reach of the London student and art-workman an excellent series of examples of the best architectural art. It is with great satisfaction that attention is drawn to the fact that modifications having been made in the regulations of the Voluntary Examinations of the Institute of Architects, and it having been decided to grant a certificate to those candidates who passed successfully, there were several applications at the period appointed for receiving them in the spring of this year. An examination has been held, with results that three students have passed the preliminary examination, and four have passed in the class of proficiency. It is specially desired to draw the attention of the allied societies to these circumstances, in the hope that they may be able to induce students from various parts of England to present themselves as candidates at the examination of future years.

"The ideas of this examination becoming so usual as to grow at last indispensable to the reputation of an architect of repute; of general admission into the ranks of the Institute being through this examination; and of its being possible, by these means to elevate the standing of the profession, are beginning to take root in men's minds. They are the germs of better things, and if it is ventured to look forward to the future with hope, it is because a sense of the necessity for a better system of education and for a recognised standard of attainment is manifestly gaining ground."

The next subject brought under discussion was the custom, law, and expediency of an architect retaining his plans.

The CHAIRMAN said some members of the profession were of opinion that they had an absolutely legal right to retain their plans; others considered it a right established only by custom; others simply thought it desirable, whilst others thought the retention of the plans a macter of no moment. He invited the members present to state the results of their experience.

Mr. HINE said his experience supported the universal practice of retention.

Mr. DREW cited a case which occurred forty years ago in Ireland, and which was identical with Mr. Barry's case. The architect of the Public Board of Works in Ireland, Mr. Murray, was paid £500 a year and a percentage of five per cent. on all public buildings; he did the work in a public office; his clerks were paid by Government. The Government made a change, and called upon him to confine himself to the duties of the office, with an increased salary; he resigned his office, but refused to give up any drawings he had prepared while holding office, and succeeded in retaining his plans.

Mr. OLIVER said that, having succeeded in a competition for the North Riding Infirmary, after carrying out the works, and upon rendering up the building to the Corporation, he was asked by the town clerk to deliver up the drawings. He maintained they were his own property. The town clerk said the Corporation would go to law. He (Mr. Oliver) said that if they would not make it expensive he would join them in a friendly lawsuit for the purpose of settling the principle. The commlttee, however, dropped the matter, and he retained his drawings.

Mr. DREW said a similar case was that of Mr. Rogers, against whom proceedings were commenced by the Town Council of Cashel because he retained his plans. He consulted counsel, who very strongly advised him not to give up a single paper. It was to be presumed that the Town Council also consulted counsel and received the same advice, for the matter was dropped. He knew of other similar cases.

Mr. HINE said it was his practice to bind up the plans, bills of quantities, contracts, and every paper connected with it into one book, the custody of which had always remained with him as the umpire between builder and client, without dispute by either.

After a lengthened discussion, the following resolution was agreed to unanimously: "That in the experience of the delegates present, the custom of the architect retaining his plans of the building which he has carried out has been universally adhered to, and that it is desirable it should be maintained."

The next questions brought before the delegates were those of voluntary architectural examinations, the probabilities of a future compulsory examination and diploma, and the present advantage derived by students from such examinations. It was generally admitted that they must be beneficial, not only to students, but, through them, to the profession at large, and also to the public, but, that although voluntary examinations were more productive of honour to those who submitted to them and passed them successfully, yet compulsory examinations would be productive of greater utility, because, having a more definite and practical result, they would be more widely attended and supported by students. After considerable discussion, it was unanimously resolved "That the delegates present pledge themselves individually and for their societies to urge on the younger members of the profession within the scope of their influence, the importance of preparing for and passing the various voluntary examinations arranged by the Royal Institute of British Architects, as they feel that the best assistance of the profession throughout the United Kingdom is due to the Institute, with a view to rendering these or similar examinations compulsory, and thus obtaining a better individual standing for the practising architect, in the hope of a better collective standing for the profession."

The following resolution was also carried unanimously:—"That in the opinion of this Alliance, it is very desirable that the Royal Institute of British Architects institute examinations in the provinces."

The following Officers were then elected in place of those retiring:—Mr. Hine as President; Mr. Rickman as Vice-President; and Mr. Douglass Mathews as Secretary.

The accounts of the late Treasurer and Secretary were then audited and passed, and the proceedings closed with a vote of thanks to the retiring officers.

THE GENERAL BUILDERS' ASSOCIATION.

THE annual general meeting of this Association was held at Manchester yesterday week. In their report, the general Committee, after congratulating the Manchester builders on their successful opposition to the claims, of the Trades Unions, express their opinion that little will be done by the Legislature this session towards a settlement of the various questions connected with Trade Unionism than to continue in force for another year, the temporary act passed last session for protecting Union funds.

Upon the contract question, they feel that the Council of the Royal Institute of British Architects is seriously affecting the interests of builders, and putting them in a wrong position with the Committee of the Architectural Alliance. They therefore purpose asking for an immediate interview with the Council. Mr. W. B. Briggs, of Birmingham, has been appointed president for the ensuing year.

MODERN INDIAN ORNAMENT.

IN the study of the decorative arts of various times and places it is not difficult to distinguish the character of the people and the influence of their respective religions and governments. This is particularly observable in the traditional and unerring instinct which directs Eastern art.

The Arab, Persian and Hindoo, although varying much in their ornamentation, still retain the Moresque type throughout. In modern Hindoo ornament, we can distinctly trace the small, yet dexterous hand of the simple-minded, superstitious native, happily contented, as are most Oriental artists, to follow in the path of his predecessors.

Founded on Arabian and influenced by Persian, Indian art combines the geometrical elements of the one with the Greeky refinement and flowing natural foliage of the other, executed occasionally with a carelessness peculiarly its own, which makes us often wish that the Hindoo would take an idea of care from his celestial neighbour.

We have, this week furnished our readers with a few examples of modern Indian ornament, taken principally from carvings and lacquer work at the Indian Museum. We can only submit them as specimens of ornate form, one of their greatest charms, their colour, it being out of our power to supply.

O. W. D.

Building Intelligence.

CHURCHES AND CHAPELS.

ARUNDEL.—The foundation stone of a new Roman Catholic church was laid at Arundel, Sussex, last week by Dr. Morris, Bishop of Troy. The church, which is to be erected at the expense of the Duke of Norfolk, will be of the Later Middle Pointed style. The principal material used will be Bath stone. The church will be 180ft. long, and cruciform in plan, with six altars, and tower and spire 266ft. high, with porch under the tower.

ASHFORD.—The restoration of the chancel of the parish church has begun, by a local firm, under the direction of Ewan Christian, Esq., architect to the Ecclesiastical Commissioners. The east window is to be restored and reglazed.

BANFF.—The foundation stone of a new (Roman) Catholic chapel dedicated to our Lady of Mount Carmel has been laid. The chapel consists of nave, ante-space and sanctuary, the latter terminating in an apse. The internal length of the chapel is 68ft. The nave is 23ft. wide, ante-space 19ft. wide, and the sanctuary 15ft. wide, and the internal height is about 25ft. The nave will contain sittings for 234 persons, and a small gallery in the S.W. end 30 sittings for choir and space for organ. At the south-west corner of the chapel there is a campanile or bell turret of

masonry, surmounted with ornamental finial cross, in all 64ft. high. The style is First Pointed. The whole cost of the building will be about £1250. Elgin stone is used for all the dressings, and the fronts are filled in with small courses of black stone of the locality. Mr. Alexander Ellis, of Aberdeen, of the firm of Ellis and Wilson, is the architect.

BERMONDSEY.—A new church, dedicated to S. Anne, has just been completed in the Fort-road, Bermondsey. The church, which will seat 800 persons, is Early English in style, and has been erected from a design by Mr. Alfred Porter, architect. Mr. Joseph Trayler was the clerk of the works, and Messrs. Browne and Robinson the builders.

BUILDING AND ENLARGING CHURCHES AND CHAPELS.—The Incorporated Society for Promoting the Enlargement, Building, and Repairing of Churches and Chapels held its usual monthly meeting (the last but one of the present session) on Monday, at the Society's house, 7, Whitehall, S. W. Grants of money were made in aid of the following objects, viz.:—Building new churches at Brookfield, in the parish of S. Ann's, Highgate; Great Strickland, in the parish of Thrimby, near Penrith, Westmoreland; Hackney, All Saints; Hammersmith, S. Matthew; and North Woolwich. Enlarging or otherwise increasing the accommodation in the churches at Bletchingdon, near Oxford; Bowers-Gifford, near Rayleigh, Essex; Briton Ferry, Glamorgan; Byfield, near Daventry; Croydon; S. Andrew, Kent; Edgcott, near Aylesbury; Harescombe, near Stroud; Kenderchurch, near Hereford; Kirby-under-Dale, near York; Knowles Hill, near Twyford, Berks; Lyonshall, near Kingston, Hereford; Swingfield, near Canterbury; and Woolley, near Wakefield, Yorkshire. Under very urgent circumstances the grants formerly made towards building a church at Traveller's Rest, in the parish of Swinbridge, near Barnstaple, Devon, and towards reseating and restoring the church at Rainham, near Sittingbourne, Kent, were each increased. A grant was also made from the School, Church, and Mission House fund, towards building a mission church at Hoxton, S. Peter's, London. The Society likewise accepted the trust of sums of money as repair funds for the churches at Trowbridge; S. Thomas, Hastings; S. Mary and Shortlands S. Mary Kent.

HARTLEPOOL.—It is the intention of Messrs. Richardson and Sons, of the West Hartlepool Rolling Mills, to erect a new chapel, adjacent to their extensive works, for the use of the men in their employ (and their families) who reside in the locality. It is intended to seat over 400 persons, and is to measure 75ft. by 45ft. Mr. J. P. Pritchett, of Darlington, is to be the architect.

LONGHOPE CHURCH.—The spire and upper part of the tower of this church have for some time past been in a dangerous and dilapidated condition; the vicar and churchwardens therefore took the matter in hand, and have placed the edifice in safety. The spire has been taken down, together with the tower to the ringing floor; the stonework has since been rebuilt, and the tower furnished with handsome crocketed pinnacles. All the woodwork is new, the bells have been rehung, the tower has been re-roofed, and the outside pointed. The work has been executed in a very satisfactory manner by Mr. Organ, Mitcheldean, from the drawings and under the superintendance of Mr. Maberly, architect, Gloucester.

MARKET DRAYTON.—A new Baptist church was opened here on Thursday week. The cost of erection is estimated at between £500 and £600. The length is 44ft., and the elevation 23ft. It is constructed to seat about 210 persons on the ground floor, besides which there is a wing on the west side, the ground floor of which is intended for a vestry, and the second floor as a gallery, which will seat about 40.

METHODIST FREE CHURCH, BYKER, NEWCASTLE-UPON-TYNE.—The foundation stone of a new church at this place was laid on the 16th of June, by George Luckley Esq. The church has been designed by Mr. S. Oswald, architect, of Newcastle, and will be of stone, in the Early English style, having five lancet windows in the north or front gable, and ten lancet windows in the east and west walls.

S. STEPHEN'S CHURCH, WALWORTH COMMON—This church is now being erected in Villa-street, near the Albany-road. The north front will face one of the newroads to be laid out on the Walworth Common estate, and the west front will be towards Villa-street. The structure will be in the Gothic style, of Early Italian character; the walls will be built of brick and faced inside and out with Beart's perforated white bricks; the arches of the nave supporting the clerestory will be constructed with white moulded bricks and red terra cotta, which have been specially manufactured by the Whitwick Colliery Brick Company, Leicester, from the designs of the architects. The dressings to doors, windows, buttresses, &c., will be of Bath stone. The church will consist of a nave, north and south aisles, and chancel. The nave will be 81ft. long, 30ft. wide, and 50ft. high, lighted by 10 two-light clerestory windows, and covered with a close-boarded arch-shaped roof. The north and south aisles will be 81ft. long and 8ft. wide, with lean-to roofs. At the west end of the building will be a spacious porch or narthex the whole width of the nave. There will also be a porch in the north aisle facing the new road. The chancel will be 28ft. deep, 22ft. wide, and 36ft. high, terminated by a three-sided apse; it will have a vaulted roof constructed of concrete, supported on moulded stone ribs. There will be three lancet windows in each of the seven bays of the chancel, and beneath these there will be a deeply-recessed arcade. At the south-west corner of the church there will be a tower 22ft. square, which will rise to a height of 120ft., and constructed to receive a peal of bells. Sittings will be provided for 614 persons on the ground floor, and 153 in a west gallery; the seats will be open, of deal, stained and varnished. The contract is taken for the works, exclusive of the tower, by Mr. Tarrant, of New Kent-road, for the sum of £5186. The architects are Messrs. Henry Jarvis and Son, of Trinity-square, Southwark.

BUILDINGS.

CHARING CROSS HOSPITAL.—Considerable additions are (according to a medical contemporary) about to be carried out at this hospital. The lease of several houses adjoining the hospital having expired, it is intended on acquiring these, to erect a new wing, which will afford room for twenty additional beds. Accommodation will also be afforded for a physiological laboratory, and new *post mortem* room. The medical school, also, will be further and considerably enlarged on the expiring of the lease of the building now known as the Charing Cross Theatre (formerly the Polygraphic Hall).

GLOUCESTER.—On Whitsun Monday the new schools for S. Luke's district were opened by the Dean of Gloucester. The schools are constructed mainly of red bricks, with bandings of stone and blue bricks at intervals. The central school gable contains a circular window, deeply recessed, the arch being supported by carved columns, and the whole surmounted by a well-proportioned bell turret. The two side schools have three-light windows at each end, stone mullions, heads, and cills. The buildings are enclosed, as regards the front, with substantial brick piers, finished by stone caps and iron railing and gates, while the remaining fencing consists of wood and brick. The cost of the schools and teacher's residence, including the purchase of the land, will be over £300. The architect is Mr. Maberly, of Brunswick-road, Gloucester, and the builder is Mr. S. J. Moreland.

GUISBOROUGH.—Owing to the briskness of trade in this town, the population has very largely increased, and the demand of houses has not been met by the supply. Fifty new cottages are about to be built at the works of Mr. H. K. Spark, and several private gentlemen intend commencing builings operations.—The Town Hall has been found inadequate for some time past, and it is now being raised 12ft. higher, in order to provide additional offices.—A new school for infants in the New Road is in course of erection.

YORK.—A reredos composed of painted tiles, from the studio of Mr. J. W. Knowles, has recently been erected in S. Sampson's Church, York. The central portion, which is enclosed in a carved stone frame, is designed to form three quatrefoil panels, divided by small elongated niche panels. In the centre quatrefoil, on a diapered blue ground, is the Agnus Dei, and in the side quatrefoils are angels. In the small panels a conventional treatment of the rose and lily is painted on a chocolate ground. The space under the central portion of the reredos which occurs at each end of the Communion Table is of diaper, in maroon, yellow, blue, and white. The wall space on each side of the reredos, extending to the chancel side-walls, is also of tiles, on which is painted diaper work. The stone work and fixing of the tiles was executed by Mr. Cole, of Gillygate.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

RECEIVED.—R. B.—W. S.—W. Y.—J. and W. E.—M. C.—G. F.—T. W. C.—J. H.—W., Sutherland—P. and Sons—J. S.—H. J. B.—J. C.—L. F.—J. T.—J. H.—T. L. L.—W. and S.—F. F. M.—W. G. W.—J. H. R.

J. OSWALD.—Not suitable, sketch returned.

F.—"Intercommunication" answers.

Correspondence.

IMITATIONS OF WOOD AND MARBLE.

(To the Editor of THE BUILDING NEWS.)

SIR,—When any one discourses sensibly upon "arrant nonsense," the reader naturally grows suspicious, and begins to fear that the sense may be nonsense, and the nonsense sense. Some such feeling, I suppose, led me to suggest to the writer of the article which called forth this discussion, that it might after all be only a windmill at which he levelled his Quixotic lance. I see from his reply that he is still somewhat blinded by the dust which the dirt has made; and as I am sorry that he should even seem to throw the weight of his experience into the scale against what is really sense, not nonsense, perhaps you will allow me to defend the consistency of my interpretation of Mr. Ruskin's nonsense.

I understand the paragraph originally quoted to mean no more and not less than this—that in order to advance the interests of decorative art in form and colour, it would be well to discourage imitations, or drop them altogether. If this be not the meaning of Mr. Ruskin, I have misunderstood, and never hope to understand, him. Imitation woods and marbles offer but a poor field for the study of either form or colour. Decoration once got on very well without them, and would get on better now, Mr. Ruskin thinks, if there were less time devoted to their study. The ingenious idea of learning to delineate form through the medium of a transparent section is certainly the pursuit of knowledge under difficulties, and some marbles are gay with colour, but the inevitable tendency of such training will be, as experience shows it to have been, either to perpetuate dullness or its opposite in the nightmare-provoking patterns of marble alluded to by another correspondent.

The writer, however, confounds this special argument against imitations—viz., their influence upon the artist's progress—with the general principle Mr. Ruskin holds as to surface deceits in decoration. It is with this that he is quarrelling when he talks of inconsistencies and contradictions, and it is here that I should like to show that he is spending his strength in vain. When Mr. Ruskin says, "All imitations of mere material are bad," ugly, or otherwise anathematises them, I do not understand him as propounding an infallible canon of the beautiful from which there can be no appeal, and to which there can be no exceptions. From Plato down to Burke and Professor Blackie all such attempts have failed. To talk of perfect consistency in holding any theory of the beautiful is either to talk nonsense or to take the subject in dispute, which is a matter of taste, and speak of it as if it were a matter of morality. The language of Mr. Ruskin is picturesque or hyperbolic. To illustrate what I mean, take the Scripture statement, "Except a man hate father and mother &c., he cannot be my disciple." Must we hate each other therefore to be good Christians? And when Mr. Ruskin says "You will never learn either form or colour from imitation work," he only means that by devoting time and study to copy grains of wood and marble the artist will never cultivate his taste for form or colour to any great extent. When he says "all imitations are bad," he does not think them all so bad but that if we cannot get anything better they may be employed, and to this sad necessity we are too frequently reduced by the evil system which makes fine imitations the chief triumph of the ordinary painter's skill. Imitations are employed, not because Paterfamilias likes them, but because he has unfortunately no notions of his own, and most painters without them are at their wits' end for other kinds of decoration. Were such studies

kept in their proper place, as childish toys or 'prentice play, and our painters as well versed in the nature and management of their pigments as the writer of these articles in your journal, we should soon see perhaps the last of imitation woods and marbles. The theory of taste and the theory of morals often touch so closely, and their sympathy is so great, that is no wonder to find some who have held that "truth is beauty, and beauty truth." This is enough, at least for most minds, to turn the scale against all the surface deceits so faithfully denounced by Mr. Ruskin; and it is only where these denunciations begin to look alarming, and their echo splits the ear, that the contradiction of human nature starts up to defend its right in matters of taste to be a law unto itself.

If I am right in thus interpreting Mr. Ruskin, it follows that there is no inconsistency in speaking a word in behalf of wainscoat imitation. The inconsistency here turns out to be only the exceptional case, which confirms the rule. I call it wainscoat, but beg that it may be observed that it is only in respect of colour that I allow of imitation. I am content with an oak ground, glazed with brown, properly combed (as wigs should be), and well varnished. Here there is no slavish copy of the grain, no waste of time or pains in its production, nothing, in short, to offend Mr. Ruskin, and nothing surely to reprehend in the device employed to produce a broken yellow or light brown, which may stand the wear and tear of careless hands and busy feet.

In truth, the effect of broken colour is all we get from the best and most costly imitations. For I think Mr. Ruskin right when he says there is nothing either edifying or diverting in the grains of varnished wood, and if Paterfamilias ever dreams of dwelling in marble halls after walking from his lobby into bed the dream will be too surely dissipated by kicks, scratches, and discolorations, not to be repaired perhaps without paying his 3s. a yard over again for the whole.

As to cornice, I think the writer will agree with me in thinking that in many ordinary rooms, and in all cases where ceilings are low, they might be more economically decorated by substituting stencilled patterns for enrichments in connection with simple mouldings or coloured lines.

I hope that I have thus established my consistency in the small way I have gone into trimming and compromise, and may save, perhaps, some fellow sinner from running off in terror the horns of the dilemma. "Imitations are either legitimate aids to decoration, or they are not." The only sensible plan is to take the bull by the horns and hold on by both. For what have we here but the horn of Jones, "All imitations are good when the material can be used," and the more awful horn of Ruskin, "All imitations of mere material are bad." When two such doctors differ there can be no doubt but that both are right; and it becomes a sacred duty to try and reconcile the two. This is not difficult, for the practical inconsistencies which follow from rigid adherence to either rule may be considered the exceptions which prove the other to be true.

I am not sure, however, that there is any dilemma here at all. The logical monster has too many horns. For what does the writer mean by "the legitimate in decoration?" Does he mean legitimate in point of beauty, or legitimate in respect of position, or in point of economy or durability, or in its bearing on the progress of art and artists, or legitimate by Act of Parliament? In what or how many senses are we to take the words? If, as I suspect, "the legitimate in decoration" is here only a synonym for the word "beautiful," any one is entitled if he pleases to consider any or all imitations beautiful, since there is no accounting for tastes, and St. Anthony admired a pig.—I am, yours &c.,

J. R. W.

PATENT VICTORIA STONE.

SIR,—In your notice of the "Patent Victoria Stone" contained in last week's paper, you state that it is equal, if not superior (?) to Yorkshire flagging, while there is a difference in the cost of the material of at least 50 per cent. in favour of the patent stone. I shall be glad to know if this is a mere puff or a misprint, for I have no doubt that if the patent stone is laid under the same conditions as the Yorkshire, and taken thickness for thickness, that the price will be found to be in favour of the Yorkshire flagging, while for the purpose of repairs and access to gas and water and drain pipes the cost must be more than 50 per cent. in favour of Yorkshire flags.—I am, Sir, &c. SAMUEL TRICKETT.

Yorkshire Stone Merchant and Paviour.
2, Gresham-buildings, E.C.

SIR,—We are much obliged by your friendly notice of our stone in your last number. We should, however, be unwilling that builders or the public should suppose that our stone is 50 per cent. under the price of York stone, unless for exceptional articles. We do not profess to be more than from 20 to 30 per cent below the price of York stone on simple things like landings. But if your readers will look at the new warehouses at 25, St. Mary Axe, in which *all* the stonework is of our stone, they will see that with our stone can be done what is impossible with any natural stone whatever. They will see lintels 9ft. long, supporting the superincumbent weight, and quite unrelieved by an arch or any other contrivance. We are assured that no natural stone could stand this test, and that consequently a style of architecture is possible with our stone which is impossible with any other.—For the Patent Victoria Stone Company, THE MANAGER.

Bonner-road, Victoria-park, E., June 20, 1870.

SHOP FRONTS.

SIR—A few numbers back some sensible remarks appeared in your journal relative to shops, but one extremely important matter connected therewith was not touched upon. I refer to the lighting and arrangement of the basement area. The value of intramural ground has induced our continental friends to raise their habitations high in the air. In this country it is a peculiarity the going downwards to get room, and a bad plan it is—unhealthy, creating great expense for drainage, and obstructing the footway of streets in order to obtain light. It ought to be an imperative rule with surveyors not to allow new areas to be made (I notice such in Great Portland-street), and an effort should be made to get rid of all existing. It is astonishing the apathy shown to public comfort and convenience in so fashionable a thoroughfare as Bond-street. How inferior its pavement to that of streets in Paris, broken into, as it is, by railings, raised curbs and area gratings—the latter, in some cases, dilapidated—such things being both obstructive and dangerous! It is remarkable that the shopkeepers, one and all, do not for their own interests' sake get rid of what is a nuisance to the general pedestrian and the horror of ladies and children, and it is no less a wonder that there is not parish or municipal power to compel the removal of these abominations.

If the use of the basement for living rooms was given up it would be well, but in abolishing the gratings, &c., it is not absolutely necessary to sacrifice the story. The plan to adopt is this. Cover the present areas with slabs of thick rough glass, and form openings for further light and ventilation under the show-board, setting back the front wall of basement some three or four feet, and having a light iron railing at verge of pavement in a line with sash front. This is not quite so well for the basement, but I consider that in this case private convenience is of far less consequence then the public advantage. The change, as admitting the approach of persons close to the shop window, may certainly be considered as a decided advantage to the shopkeepers' pockets.

This alteration made along the street, and the projecting premises opposite the Clarendon Hotel set back, the which, from the obstruction to the carriage traffic is an improvement much required, this popular thoroughfare would be somewhat more worthy the commendation bestowed upon it by the author of "Lothair" as being the most interesting street in the world.—I am, Sir, yours faithfully,

P. E. MASEY.

CRITICISM OF DESIGNS IN ARCHITECTURAL EXHIBITION.

SIR,—I am happy to be able to relieve your mind on the subject of the design for Clapton Park Chapel. It is not the selected design about to be executed, but, as clearly *stated in the catalogue*, it is one of the "two designs selected" out of about half a dozen.

The finally selected design was by Mr. Fuller, and is now in course of erection.

16, Southampton-street, Strand. EDWD. W. ROBINS.

THE plans sent in by Mr. Samuel Musgrave, A.R.I.B.A., of 5, County Buildings, Hull, have been selected by the trustees for the proposed new Primitive Methodist chapel, Lincoln street, Hull, and will be carried out as early as possible. There were eighteen competitors.

Intercommunication.

QUESTIONS.

[1879.]—DESIGNS FOR HEADSTONES.—Would any reader be kind enough to inform me of the best place where I could obtain designs in the Gothic and other styles of monuments and headstones suitable for churchyard memorials, and not of a very elaborate character?—COUNTRY STONE-MASON.

[1880.]—ARCHITECTS CHARGES.—Can an architect charge for journeys in carrying out works if the building is situated 4½ miles from his house or residence?—T. S. L.

[1881.]—PROBLEMS.—Can anyone tell me how to find the area of a composite ellipse and also the solid contents? For instance, the solid contents of an egg, and the area of such a shaped figure. What book should I find it in?—A. A. H.

[1882.]—BUILDING CHURCH SPIRE.—Would any of your correspondents kindly inform me whether in building church spires it is usual to joint the stone with a hang or weathering on the upper beds, the lower beds being carefully fitted to same so as to prevent the joints from drawing water, and whether the joints should be set with Portland cement, or (as the spire is of white stone) jointed with white lead putty, as the present spire draws water to such an extent that it has to be taken down? Also in rebuilding the spire the proprietor wishes a ladder constructed on the outside for access to the finial, &c. Is galvanised iron a suitable material for forming the same, or is there any danger of it rusting and staining the stone?—R. E.

REPLIES.

[1874.]—GLASS DRAWING BOARD.—Cut a square opening through a drawing board, leaving a margin, say 3in. wide. Let the edges of the opening be rebated to receive a sheet of plate glass let in flush with the face of the board. This board when in use is placed on a table in front of a window, and supported at an angle of about 25°, so as to get a strong light underneath, which may be further increased by the reflected light from a sheet of white paper laid on the table. The original drawing being pinned down to the board, a sheet of paper or parchment on the top, and the copy is executed directly in ink, the finest lines being plainly visible. If the upper light is too intense, increase the angle of the board, or protect the eyes from the glare by means of a shade like the peak of a cap.—ANOTHER OF US.

[1875.]—GRANITE IN ARCHITECTURAL DRAWINGS.—Take a number of bristles and tie them to the end of a stick firmly. Then cut them off quite square about half an inch long. Take a little indigo on the brush, and having carefully covered with slips of paper all the parts of the drawing, except the required granite, hold the brush in the left-hand, and deflect the bristles with the forefinger of the right, so as to throw off small specks of colour on the uncovered part. Different colours may be used, according to fancy.—E. C. F. M.

Our Office Table.

EDINBURGH ARCHITECTURAL ASSOCIATION.—The twelfth session of this Association was brought to a close on Wednesday week, when the affairs of the society were laid before a general meeting of the members held in the hall, 5, S. Andrew-square.—Mr. Thomas Ross, the retiring president, who occupied the chair, opened the proceedings by delivering his valedictory address, in which he reviewed the doings of the society during the past year, referring to its largely extending usefulness and the extent to which it was being appreciated by the great increase of membership since the previous annual meeting.—Mr. Blanc, hon. secretary, then read the annual report, which showed the present membership to be 127, which, with 4 associates and 13 honorary members, make a total of 144, and from the many interesting subjects brought forward in the form of essays, &c., during the session, showed the society to be in a highly prosperous and flourishing condition. Reference was also made to the several new features introduced into the programme of the business during the year, and among others, the Saturday afternoon inspection excursions, three of which had taken place, and had been attended by a large proportion of the members.—From the report of Mr. Annan, treasurer, the funds showed a favourable balance for the Association.—On the motion of Mr. A Ballantine, the reports were adopted; and on the motion of Mr. Lawrence, a hearty vote of thanks was accorded to Mr. Ross for his able conduct as president during the session.—The following gentlemen were appointed the office-bearers for the ensuing year:—Mr. Robert Morham, jun., president; Mr. Thomar Ross, vice-president; Mr. W. Richardson, treasurer; Mr. Thomas Bonnar, librarian, re-elected; Messrs. Thomas Henderson,

John Rhind, D. O. Smith, and Peter Lawrence, Council; and Mr. Hippolyte J. Blanc, hon secretary, re-elected. It was arranged that the annual excursion should be to Tantallon Castle and the Bass Rock, to take place on Saturday the 25th inst.

LEAMINGTON SCHOOL OF ART.—This institution is henceforth to be opened during the whole year; not for the winter session only, as hitherto. Mr. Sturgeon, from the Leeds School of Art, was elected at the last meeting of the Council to be Head Master of the School. We understand that this gentleman holds a higher number of certificates than any of the other candidates, having been occupied no less than six years in the study of his profession at South Kensington.

SOCIETY FOR THE ENCOURAGEMENT OF THE FINE ARTS.—On Thursday week there was an exhibition of engravings and etchings by W. B Cooke, W. J. Taylor, George Cooke, W. Woollett, Pouncey, Sharp, E. J. Roberts, Allen, and others, Mr. Henry Tidey in the chair. A paper was read by Mr. John Saddler, in which, after explaining some of the technicalities of the art of engraving, and referring to the different qualities required to make a good etcher and good engraver, he proceeded to show how, with one colour only (black), the engraver, so to speak, translated the work of the artist, and re-produced, to a certain extent, all the various effects of a finished oil painting, and he concluded by designating "Allen's Views in Sussex" as the finest landscape plates of this century. Mr. Tidey said the work of the engraver was creative when he re-produced by light and shade the feeling that the artist produced by colour, whilst to combine the tremulous motions of the hand necessary in lines, giving the effect of bright colours, with the great firmness and precision required in etching, appeared to him an art as difficult as painting. Mr. Willmore, Mr. Cuffe, Mr. Gilks, and others, addressed the meeting, and after a reply to some objections, the proceedings terminated with the usual votes of thanks to chairman and lecturer.

THE EDUCATION OF SCOTTISH ARTISANS.—The Council of the Royal Scottish Society of Arts have interested themselves in arranging a series of public meetings on the subject of the scientific education of artisans, tradesmen, and mechanics. The services of Mr. Buckmaster were placed at their disposal, and during the past month the provosts and magistrates of Dundee, Forfar, Arbroath, Brechin, Montrose, Stonehaven, Peterhead, Banff, Aberdeen, Kirkwall, and other places, have convened meetings at which the question has been thoroughly discussed. It is felt that Scotland, in opportunities for the scientific instruction of artisans, is far behind both England and Ireland. Active committees have been formed in several places to co-operate with the Science and Art Department in the institution of classes.

THE NORTHERN ARCHITECTURAL STUDENTS SOCIETY.—This Society has just published its first annual report, which says it has been the means of introducing to each other students of our profession who might, otherwise, never have become acquainted; and has afforded them valuable opportunities for the free interchange and comparison of thought, information, and opinion. The following is a brief abstract of the Society's proceedings from its commencement. In the month of November, last year, two preliminary meetings were held, at the second of which (on the 30th of that month) a code of rules was drawn up, and the office-bearers of the society for the session were elected. On the 14th of December, the inaugural address was delivered by the president (W. L. Newcombe), and since then, seven papers have been read and discussed, viz.:—"The Studies of a Young Architect," by W. S. Hicks; "Landscape Gardening," by W. Bedlington; "Decoration," by C. Hall; "Villa Architecture," by J. H. Morton; "Domestic Architecture," by J. Oswald; "Foundations," by G. D. Oliver; and "Timber used for Building Purposes," by E. Thornhill. Besides the indoor meetings of the society, at which these papers formed the principal business, two outdoor meetings were held.

PRESENTATION TO THE BISHOP OF PETERBOROUGH.—A very handsome crozier was presented to the Bishop of Peterborough at the consecration of St. Andrew's, Kettering, on behalf of a large number of the laity in the archdeaconries of Northampton and Leicester. The crozier was designed by the Rev. F. H. Sutton, vicar of Theddingworth, and executed by Messrs. Skidmore, of Coventry. It is in the style of the middle of the fourteenth century; the staff is of ebony with ivory bosses, and the head is ivory and silver gilt, jewelled with carbuncles, topaz, and lapis lazuli. The carving of the crook represents our Lord's charge to S. Peter, and "Feed my sheep, feed my lambs," is inscribed upon it.

PROTECTION OF LEAD WATER PIPES.—A paragraph is going the rounds of the scientific journals and the newspapers generally, to the effect that Dr. Schwarz, of Breslau, has found a simple way of protecting lead pipes from the action of the water, by forming on their inner surface an insoluble sulphide of lead. This is done by filling the pipes with a warm and concentrated solution of sulphide of potassium or of sodium, which is left in contact with the lead for about fifteen minutes. This, says the Boston *Journal of Chemistry*, may be a new thing in Breslau, but more than two years ago we suggested a similar process as, on the whole, the best that we knew for the purpose. The directions we gave were as follows: Dissolve 1 pound of sulphide of potassium in two gallons of water, and let it remain in the pipe twelve hours, or until the inside is thoroughly blackened. The same recipe was given in Rolfe and Gillet's "Hand-book of Chemistry," published in 1868. The use of a warm saturated solution, as Dr. Schwarz directs, would do the work in shorter time, which might be more convenient in some cases.

FIRE AT THE HOUSES OF PARLIAMENT.—Shortly after two o'clock on Tuesday morning a fire was discovered in the Clock Tower of the Houses of Parliament. The House of Commons having adjourned, the man on duty went up to the tower, as usual, to turn off the gas which illuminates the clock, when he found a quantity of smoke, accompanied with a strong smell of burning. Immediately an alarm was given by him, and on investigation it was found that the matting which is placed on the flooring of a chamber under the weights of the clock, in order to prevent damage if they should fall, had begun to smoulder. The man applied the hose (which is always laid on), and checked the fire. The official report of Captain Shaw, the chief officer of the Metropolitan Fire Brigade, states that the fire is supposed to have been caused by the heat of the furnace in the basement. As to damage, he states that about four tons of cocoanut fibre, doors, windows, and base of clock tower were severely damaged by fire and heat.

PROPOSED IMPROVEMENTS IN HOXTON.—A local paper states that there is a probability of a substantial improvement being effected in the district of Hoxton, consequent on the rebuilding upon the Tyssen estate, the leases of which are just falling in. Two narrow streets—Huntingdon-street and Great Essex-street, leading from Hoxton to Kingsland-road, are to be rebuilt. The width of these streets is about 24ft., much too narrow for public convenience and for the purposes of light and air. It is now proposed to widen Huntingdon-street to 40ft., and as this street opens into the Kingsland-road, directly opposite to Woolpack-passage, which leads into Thomas-street, Hackney-road (which street, it is to be hoped, will one day be opened as a public carriage thoroughfare), Huntingdon-street would then, if widened, form part of a very useful and direct thoroughfare leading from Hoxton, Islington, and the City-road to Columbia Market and the Hackney-road.

THE CHANNEL PASSAGE.—With respect to the improvement of the Channel passage, it has been suggested that the Municipality of Boulogne and Chambre de Commerce should vote the supplies to offer two or more prizes for the best plans, specifications, and estimates of improving the present port, so as to make it Mediterranean, regard being had to the improvement of the bay, so as to afford anchorage and shelter outside the port, and divert the currents which at present cause the sand-bar; and that such plans should be submitted to a committee of French and English engineers.

NEW FLOORING OR WAINSCOATING.—A new method of ornamentation consists in a floor-covering and wainscoating of wood, a manufactory of which is just being started in Chicago. It is composed of lath-shaped strips of every variety of handsome woods, glued securely in every imaginable geometrical pattern, on a twilled canvas bottom, presenting very handsome inlaid work. It can be furnished of the more common woods at a moderate price, or fancy woods and elaborate patterns may be laid at almost any extravagance of outlay. The wood is kiln-dried, beyond all shrinkage, and floors or wainscoating can be removed from place to place.

Chips.

The section of the Thames Embankment between the Temple and Blackfriars is to be opened at the end of July or the beginning of August.

The foundation stone of a new church in the Plough-road, Rotherhithe, was laid on Saturday week, by Field-Marshal Sir W. Gomm.

The House of Commons Committee on the Brixton and Stockwell Tramway on Friday last decided not to allow the line to cross Westminster Bridge. Mr. Thomas Page, C.E., the engineer of the bridge, was one of the witnesses in opposition to the echeme.

The Governors of the Taunton and Somerset Hospital, Taunton, have resolved upon alterations and additions to their building at a cost of £2000.

The restoration of the parish church of Romaldkirk, is now completed, with the exeeption of the belfry. The cost has been £550.

The Borough Surveyship of Durham is vacant. The salary is £150 per annum.

The Social Science Congress for 1870 is appointed to be held in Newcastle-upon-Tyne during the last week in September. Arrangements are being made for its reception.

The inaugural ceremony of opening the new college at Dulwich took place on Tuesday, under Royal auspices.

Mr. Thomas Lewis Johnson has been dismissed from the office of assistant surveyor to the Northern district of S. Pancras.

A new Congregational chapel is now in course of erection at Wilmcote, Warwickshire. Mr. J. Lattimer, of Stratford-on-Avon, is the architect. The cost will be about £500.

The corner stone of a new Congregational chapel was recently laid at Whixall, Shropshire.

The *Gazetta Officiale* of Florence states that the total length completed of the Mount Cenis Tunnel on May 31, was 11,189 metres. There only remain 1030 metres to be got through.

The memorial stone of a new Congregational chapel, was laid at Brighton on the 1st inst. The site is at the junction of Clifton and Dyke-roads, and the chapel which will be Byzantine in style, and oval in form, will seat about 1000 persons. The estimated cost is £6000.

Timber Trade Review.

Sale of dry cut St. Domingo, Mexican and Honduras Mahogany, Wainscoat, Oak, Maple, Ash, and Veneers yesterday. The prices brought by the above hard woods at Messrs. J. H. Smee and Co.'s sale will be interesting to buyers, because it is seldom they have an opportunity of knowing what the value of such goods is when sold by auction. We have not given the prices of the pine planks, &c., as these are sold by auction nearly every week, and their value is well-known.

			d.		d.
Quebec birch,	3in. thick	ft. superficial of 1in.	1½		
Do.	2½		1½		
Do.	1		2½		
Do.	1¼		2½		
Do.	1⅛		1¼		
Do.	⅜	do. of ⅜in.	1		
American walnut,	5in. thick	do. of 1in.	5¾		
Do.	1		6¼		
Do.	¾	do. of ¾in.	3⅔		
Baltic wainscoat,	1½in. thick	do. of 1in.	6½	to	
Do.	1½		6½	„	7¾
Do.	1		6½	„	7¼
Do.	¾	do. of ¾in.	5¾	„	6
Do.	½	do. of ½in.	3½		
Honduras mahogany,	1in. thick.	do. of 1in	4¾	„	5¼
Do.	1¼		4½		
Do.	¾	do. of ¾in	5	„	5½
Do.	½	do. of ½in	3½	„	4¼
Do.	¼	do. of ¼in	1½		
Brown oak		do. of 1in	2½		
Tobasco mahogany,	1in. thick		6½	„	7
Do.	¾	do. of ¾in	5	„	5¾
Do.	½		5		
Spanish mahogany,	1¼	do. of 1in	7½		
Do.	1½		4½	„	5½
Do.	1		7	„	12½
Do.	¾	do. of ¾in	4½	„	7¼
Do.	⅝	do. of ⅝in	4¼		
Do.	½	do. of ½in	3¼	„	5
Ash,	1½in. thick	do. of 1in	1½	„	3
Do.	1¼	do. of 1in	2½		
Do.	⅞	do. of ⅞in	2½		
Do.	⅜	do. of ⅜in	¾		
Sycamore		do, of 1in	1½		
Maple			1		
English oak,	6in. thick		5	„	5½
Do.	2½		4½	„	
Veneers, Walnut, and Rosewood, per foot superficial			3		
Do.	Houduras mahogany		1½		
Do.	Spanish mahogany		6		
Do.	Baltic wainscoat		1¼		
Do.	Birch		2		
Do.	Dyewood		1½		
Do.	Pollard oak		2		
Do.	Brown oak		2½		
Do.	Ash		½		

Messrs. Churchill and Sim's sale of wood is postponed to Wednesday next, the 29th inst.

LATEST PRICES OF MATERIALS USED IN CONSTRUCTION.

TIMBER.

	£ s.	£ s.
Teak .....load	12 10	13 10
Quebec, red pine	3 15	4 15
,, yellow pine..	4 0	5 0
St. John, N.B. yellow	0 0	0 0
Quebec oak	5 15	6 10
,, birch	3 15	4 10
,, elm	4 5	5 5
Dantzic oak	4 5	6 5
,, fir	2 5	4 0
Memel fir.....	2 10	3 15
Riga	2 15	3 2
Swedish	2 0	2 13
Masts, Queb. red pine	3 10	5 10
,, yellow pine ..	3 10	5 10
Lathwood, Dant. fm.	4 0	5 0
,, St. P'burg.	5 10	6 10
Deals, pr C., 12ft by 3 by 9 in.		
Quebec, white spruce	12 10	17 10
St. John, white spruce	12 10	14 0
Yellow pine, per reduced C.		
Canada, 1st quality..	18 0	19 0
2nd do.....	12 0	13 0
Archangel, yellow ..	11 0	12 10
St. Petersburg, yel...	11 0	12 10
Finland	6 10	8 0
Memel	7 0	9 0
Gothenburg, yellow	8 0	9 10
,, white ..	7 10	8 0
Gefle, yellow	9 0	10 10
Soderham	8 0	9 10
Christiania, per C., 12 ft. by 3 by 9 in yellow	10 10	12 10
Flooring Boards, per sq. of 1in., first yel.	7 6	10 6
First white.....	7 0	9 6
Second qualities	6 0	7 0
PUMICESTONE pr tn	6 0	8 0
OILS, &c.-		
Seal, pale .. p r tun	38 0	0 0
Sperm body.....	90 0	0 0
Cod.....	41 0	43 0
Whale, Sth Sea, pale	37 10	0 0
Olive, Gallipoli.....	51 0	0 0
Cocoanut, Cochin, tun	45 0	0 0
Palm, fine	38 10	39 0
Linseed.....	31 10	0 0
Rapeseed, Eng. pale..	45 10	0 0
Cottonseed	30 0	35 0

METALS.

		£ s.	£ s.
LEAD :—			
Pig, Foreign .....per ton		17 12 6	17 15 0
,, English, W.B.	do.	19 5 0	0 0 0
,, Lead Co.	do.	18 12 6	18 15 0
,, Other brands	do.	18 0 0	18 2 6
Sheet Milled	do.	18 10 0	0 0 0
Shot, Patent	do.	21 0 0	0 0 0
Red or minium	do.	19 15 0	20 0 0
Litharge, WB	do.	0 0 0	0 0 0
White dry	do.	25 10 0	30 0 0
,, ground in oil	do.	0 0 0	0 0 0
COPPER :—			
British—cake and ingot .....per ton		71 0 0	0 0 0
Best Selected.....	do.	72 0 0	0 0 0
Sheet	do.	75 0 0	76 0 0
Bottoms	do.	78 0 0	0 0 0
Australian.....	do.	73 0 0	75 0 0
Spanish Cake		0 0 0	0 0 0
Chili Bars	cash	67 15 0	68 10 0
,, refined ingot		71 0 0	72 10 0
el. Metal Sheathing & Rods .....per lb.		0 0 6¾	0 0 6¾

Trade News.

TENDERS.

BATTERSEA.—For a new wharf for the Patent Plumbago Crucible Company (Morgan's patent). Contract No. 1, wharf, walls and basement story. Mr. R. M. Ordish, engineer. Quantities supplied by Mr. W. B. Backshell :—

Ebbs and Son	£2570
Manley and Rogers	2365
Markwick and Thurgood	2356
Baguley.....	2300
Bayes and Ramage.....	2150
Dickinson and Oliver	2100
Sharpington and Cole	1877
Jackson and Shaw (accepted).....	1600

BRENTFORD.—For rebuilding the Seven Stars publichouse, for Messrs. Young and Bainbridge. Mr. G. A. Young, architect. Quantities by Mr. C. J. Shoppee :—

		Old Materials.
Sims	£1700	£20
Parsons	1572	75
Adamson (accepted)	1497	30

CITY OF LONDON Hospital for Diseases of the Chest, Victoria-park. Messrs. Beck and Lee, architects. Quantities by Messrs. Welch and Atkinson :—

Ashby and Horner	£10,285
Ashby and Sons	9990
Mansfield and Price	9947
Conder	9780
Myers and Son.....	9687
Higgs.....	9533
Perry and Co.	9495
Axford and Whillier.....	9431
Jackson and Shaw	9343
Chappell (accepted).....	8647

DALSTON.—For building shop next to the Dalston Junction Station, Dalston-lane. Mr. E. H. Horne architect. Quantities supplied by Messrs. New and Cummings :—

Mansfield, Price, and Co.	£1725
Hill, Keddell, and Waldram	1722
Brass	1675
Sewell and Son	1461
Scrivener and White	1426
Wicks and Bangs	1347

DARLINGTON.—For a Gas-tank :—

Bulmer	£2690!
Adamson	1179
Manin	1101
Young	1067
Robinson and Marshall.....	1062
Bell	935
McKernon and Prior.....	933
J. and G. Wharton (accepted)	890!

FAREHAM.—For new farm buildings at Dean Farm, on the Roche Court Estate, Fareham, Hants. Messrs. Ford and Nance architects. Quantities supplied :—

Light	£2343
Quick.....	2113
Barbidge	1998
Bramble Bros.	1887
Lawrence	1846
Fulford (accepted)	1793

HAMMERSMITH.—For house and stable for Dr. Spurgin. Messrs. Woodzell and Collcutt, architect :—

Chamberlain	£1481
Adams	1425
Dowell	1370
Cooke and Green	1331
Goodman	1213
Chessum (accepted)	1140

ISLINGTON.—For new schools for the parish of S. Bartholomew, for the Rev. Louis Stanham, M.A. Mr. Edwin Clare architect. Quantities supplied by Messrs. Weymouth and Son :—

Preedy and Son	£1950 0
Foster	1927 0
Fairhall and Weeks	1896 0
Williams and Son	1890 0
Dove, Bros.	1885 0
Conder.....	1862 0
Bishop	18 5 5
Hill and Sons	1799 0

LUDGATE TAVERN.—For building the Ludgate Tavern, Ludgate Circus. Mr. Lewis H. Isaacs, architect. Quantities supplied by Mr. L. C. Riddett :—

Macey	£4319
Holland and Hannen	4230
Patman and Fotheringham	4195
Mansfield, Price, and Co.	4116
J. B. Axford	4095
Browne and Robinson	3995
King and Sons	3925
John Phillips (accepted)	3749

NEWPORT (MON.)—For building S. Mark's Church. John Norton, architect, 24, Old Bond-st., W.

	Church, including tower.		Add for stone spire.		Total.
Rees	£5344	....	£960	....	£6304
Williams and Sons.	5580	....	400	....	5980
Moreland	5320	....	480	....	5800
Clarke	5127	....	447	....	5574
Bolt and Co.....	—	....	—	....	5363
Wall and Hook ..	5200	....	350	....	5550
Miles and Son	4870	....	600	....	5470
J. Diment.....	4818	....	600	....	5418
Jenkins & Thomas	4748	....	585	....	5333

ROMSEY.—For the erection of fever wards and other buildings at the Union. Mr. Alfred Bedborough, architect. Quantities supplied by Mr. F. Warburton Stent :—

		Deduct, if brick is used instead of stone to portion of dressings.
Bryan	£1482	..... £20
Streeter.....	1306	 42
Grace	1263	 25
Smith.....	1201	 35
Macklin	1210	 36
Rose and Co.....	1195	..... —
Bailey and Son	1196	 60
Wheeler.....	1179	 22
Grace	1137	 69
Sanders	1122	 20
Taylor and Jessop	1114	 40
Stevens	1098	 28
Martin and Son	1097	 89
Till (accepted)	1086	 15
Brinton and Bone	1080	 16
Fielder	1056	 34
Philips	1047	 18

SOUTHPORT.—For the Southport Baths and Assembly Rooms, Messrs. Horton and Bridgford architects. Mr. Charles H. Beloe engineer :—

	Contracts 1st.	2nd.	Total.	Extra for par-point facing. 1st.	2nd.
Hayes	£13,500	£2700	£16,200	£98	£42
Dover	13,919	999	14,989	90	50
Parker and Son	12,342	2335	14,677	87	41
Robinson	11,900	1900	13,800	99	44
Haigh	11,597	1987	13,584	127	60
Swindells and Little (acptd)	11,400	1692	13,092	64	22
Wade	11,019	1978	12,997	—	—
Bridge	11,095	1800	12,895	—	—

TULSE HILL.—For a House and Office, for Messrs. Rickett, Smith & Co. Mr. Gill, Croydon, architect. Quantities not supplied :—

Garrett.....	£737
Bysh.....	679
Cressel (accepted).....	658

WALTHAM CROSS.—For additions to Myddleton House, for H. C. B. Bowles, Esq. Messrs. Woodzell and Collcutt, architects :—

Rivett	£570
Chessum	535
Cooke and Green	497
Patman (accepted)	457

WOOLSTON.—For alterations and additions to Roseland Villa. A. Bedborough, Esq., architect. Quantities by Messrs. Curtis and Son :—

Gambling	£515
Chapman.....	484
Stevens (accepted).....	467

WOOLWICH.—For St. Michael and All Angels' Mission Schools and Residence. Mr. J. W. Walter, architect. Quantities supplied by Mr. W. F. Neighbour :—

Myers	£2762 0 0
Woodford	2513 10 8
Dove, Bros.	2475 0 0
Manley and Rogers	2465 0 0
Winship	2280 0 0
Shepherd	2150 0 0

YEOVIL.—For drainage works, Hendford, for the Yeovil Town Council. Mr. Bothams, surveyor :—

Baker	£865 0 0
Merryweather and Son.....	819 0 0
Hall (accepted)	734 6 8

CONTRACTS OPEN FOR BUILDING ESTIMATES.

ROCHESTER, June 27.—For the erection of a new corn exchange at the city of Rochester, on a piece of ground in the rear of and adjoining to the present Corn Exchange. Richd. Prall, Town Clerk, Rochester.

WIGAN NEW INFIRMARY, July 1.—For the erection of the proposed new infirmary for Wigan and the district. Richard Lea, hon. sec., Wigan.

HUDDERSFIELD, June 30.—For the erection of a first portion of a block of buildings comprising shops, warehouses, &c., for Sir J. W. Ramsden, Bart. W. H. Crossland, F.R.I.B.A., 25, Park-square, Leeds, and 4, Regent-street, S.W.

DUBLIN PORT AND DOCKS BOARD, June 29.—For taking up and rebuilding a portion of the north wall quay, for a length of about 1832ft., with works connected therewith. N. Proud, Secretary, Dublin Port and Docks Office.

METROPOLITAN BOARD OF WORKS, June 27.—For the erection of a fire brigade station in Ladbroke-road, Nottinghill. John Pollard, Clerk of the Board, Spring-gardens, S.W.

LEEDS, June 30.—For the erection of two villa residences. Ridley King, architects, 24, Park-square, Leeds.

LANCASHIRE AND YORKSHIRE RAILWAY, June 28.—For the erection of four cottages, at Bacup; also, for alteration at Moses Gate Station. Wm. S. Lawn, Secretary, Manchester.

LIVERPOOL CENTRAL STATION RAILWAY, July 13.—For the construction of the above railway and works. Edward Ross, Secretary, Secretary's Office, London-road Station, Manchester.

HEDINGHAM HIGHWAY BOARD, July 4.—For the paving of the footways on each side of Ballingdon-street. Robert F. Stedman, Clerk to the Board, Sudbury, Suffolk.

HULL, June 29.—New Wesleyan chapel and schools, Coltman-street, For the erection of the above-named buildings. William Botterill, architect, 23, Parliament-street, Hull.

JOINT COUNTIES LUNATIC ASYLUM AT CARMARTHEN, July 2.—For the execution and completion of the following works, viz.:—1st. For the erection of two new wings, one for male and the other for female patients; 2nd. For sundry repairs to the roofs and other parts of the existing buildings. Charles Henry Hughes, Clerk, Quay-street, Carmarthen.

NEW TOWN HALL, ROCHDALE, June 27.—For the oak joinery and fittings necessary for the completion of the building. Zach. Mellor, Town Clerk.

LEEDS, BOAR-LANE, June 29.—Lot 8.—For the erection of the above works for Messrs. Goodall and Backhouse. William Bakewell, architect, Leeds and Halifax.

REIGATE, July 1.—For the erection of a master's residence and the building of a new school room. John Lees, architect, Reigate, Surrey.

BURFORD, July 1.—RESTORATION OF THE CHURCH.—For the draining of the church and churchyard, and the warming of the church. William Scarlett Price, Honorary Secretary, Burford, Oxon.

GLOUCESTER, June 27.—For the erection of a new chapel, day rooms, and other buildings. Mr. Medland, the county surveyor, Clarence-street, Gloucester.

LONDON, July 19.—ANCIENT ORDER OF FORESTERS.—For the performance of certain works required in the erection of the intended Foresters' Hall, at Wilderness-row, Goswell-street, S. Luke's. Jno. McTernan, Secretary, Ancient Order of Foresters, L.U.D. Offices, 16, Essex-street.

BATH STONE OF BEST QUALITY.

RANDELL, SAUNDERS, and COMPANY, LIMITED, Quarrymen and Stone Merchants, Bath. List of Prices at the Quarries and Depôts; also Cost for Transit to any part of the United Kingdom, furnished on application to

BATH STONE OFFICE,
Corsham, Wilts.

ADVT.]

BANKRUPTS.

ACT 1869.—TO SURRENDER IN LONDON.

Frederick Lewis. Old Ford, timber merchant, July 1, at 12.30.

TO SURRENDER IN THE COUNTRY.

Thomas Fairhead, Colchester, timber merchant, July 5, at 9.30.

BANKRUPTCIES ANNULLED.

Frank Perry Saunders, Phœnix-yard, Oxford-street, Marshall-street, Golden-square, and Edgware-road, builder, June 20—Charles Thorp, Croydon, paper hanging manufacturer, June 14.

DECLARATION OF DIVIDEND.

T. Morris, joiner, Long Eaton, div. 4d.

DIVIDEND MEETINGS.

H. Gilbert, High-street, Notting-hill and Kensington, builder, July 11—J. W. Pollard, Liverpool, plasterer, June 27.

ACT 1869.—PUBLIC EXAMINATIONS.

G. F. Hooker, Marlowes, near Hemel Hempstead, builder, July 15—T. Eckley, Lytham, plumber, July 19—H. Sills, Mansfield, Notts, builder, July 12—A. Palmer, Hadlow, Kent, carpenter, August 11.

PARTNERSHIPS DISSOLVED.

Waugh and Hogg, Rawden, stone masons—P. and J. Lomax, Farnworth, ironfounders—A. and J. Smith, Worship-street, builders—Burnley and Nichols, Holbeck, engineers—Stodart and Wright, Birmingham, engineers—E. and T. Brown, Penrith, iron and brass founders—Davies and Cowap, Chester, lime merchants—Wright and James, Bedford-row, Gray's-inn, architects—W. and R. Wood, West Derby, brickmakers.

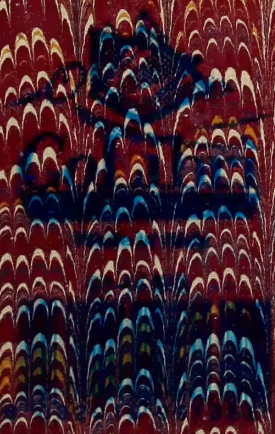
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